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METAL INDUSTRY

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ALUMINUM WORLD — COPPER AND BRASS

BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

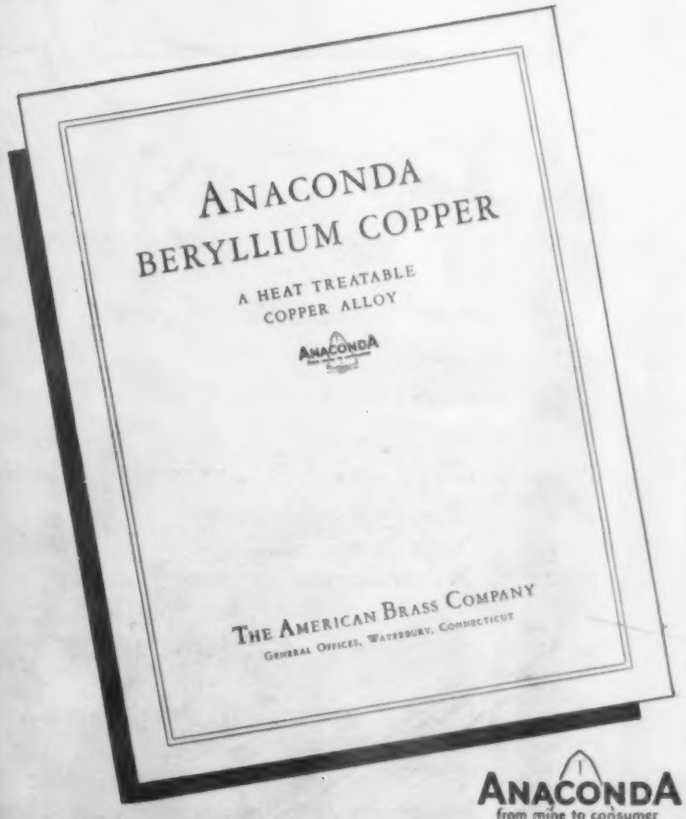
Volume 31, Number 1 JANUARY, 1933 Two Dollars Per Year

Contents Advertising Page 4 — Publication Office: 116 John Street, New York, N. Y. — Buyers' Guide Advertising Page 46

Anaconda announces

a heat treatable copper alloy...

BERYLLIUM COPPER



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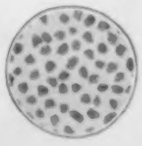

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BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

VOL. 31 NEW YORK, JANUARY, 1933 No. 1

The Metal Manufacturing and Finishing Industries of the United States

By ADOLPH BREGMAN

Managing Editor

What It is; Who Buys Its Output; Who Provides It With Equipment and Supplies. A Survey of the Available Statistics of the American Industries Manufacturing Non-Ferrous Metal Products and Finishing All Metals; Also the Trades Which Consume These Products, and the Trades Furnishing Its Needs.

THE metal working industry of the United States is an extraordinary field of activity. It is one of the most important, one of the most far-flung and one of the most basic industries in our country. At the same time it is one of the least known and understood by the general public.

The reason is simple. The metal industry is not one homogeneous industrial activity. It is a rambling, disjointed aggregation of manufactures, covering a wide variety of metals, processes and products. It spreads so far in so many directions that its outlying sections often seem to have no relation to each other, to have nothing in common. Many of its branches are separate autonomous, almost independent "principalities." Nevertheless, they all have a common origin—metalliferous ore; similar processes of extraction—smelting and electrolytic or fire refining; similar processes of working—rolling, extrusion, drawing, stamping, spinning, casting (in sand or permanent molds), and machining. They are susceptible to the same methods of finishing—electroplating, polishing, chemical coloring, lacquering and japanning; and the same type of reclamation processes from scrap—refining in suitable furnaces or by electrolysis.

The non-ferrous metal working industries include those fields which use non-ferrous metals (not iron or steels) after they have reached the ingot stage. They are sharply separated in practice from the metal producing industry, which covers mining, ore smelting and primary refining (sometimes referred to as "metal winning"). It is to the non-ferrous metal working field that this article is devoted.

Main Process Division of the Non-Ferrous Metal Working Industry

The industry is blocked out into six principal divisions, along the lines of the processes and equipment employed, as follows:

1. **Fabricating.** This work is done in rolling mills which carry on rolling, drawing, extrusion, cupping, etc., for the manufacture of sheet, rod, wire and tube.

2. **Casting.** The pouring of molten metal into molds is carried on in the foundry. This industry has spread into a number of diverse lines from the original casting of metal in sand molds. We now have die casting—the casting of non-ferrous metals in steel molds under pressure; permanent mold casting—pouring metals by hand into iron or steel molds; slush casting—pouring metals by hand into bronze molds which are then emptied quickly, leaving only a

shell of solid metal. These processes have, until very recently, been restricted to the low melting point alloys, consisting principally of lead, tin or zinc, with the exception of die casting, which uses aluminum also. The most recent development is the casting of brass in steel molds.

3. Cutting Up. This industry takes the products of the rolling mills and fashions from them finished articles for use by the ultimate consumer. The processes employed are stamping, spinning, machining, soldering, brazing, etc. It is in this type of shop or plant that the final manufacturing and assembling work is done on products for the ultimate consumer.

4. Manufacturing of Jewelry and Silverware. This industry is clearly differentiated from the others in the non-ferrous metal working group because it is restricted almost entirely to the precious metals, being engaged in the production of metal finery, tableware, flatware, etc. A considerable branch of this industry, however, is made up of the production of articles with a base metal foundation with an electroplated coating of silver or gold.

5. Finishing. In the finishing industry is applied the final surface decoration or protective coating for metal products before they are placed on the market. The most important of the processes involved are electroplating, polishing, chemical coloring, lacquering, etc.

6. Scrap Reclamation. This is the industry which gathers together the worn-out, broken or rejected pieces and parts of metals and metal products, sorts them into classes, then melts and refines them, and compounds alloys for specific uses in the foundry and even in the rolling mill. A list of raw materials for this industry would be legion as its sources are everywhere from the smallest household to the largest factory, and its supplies, everything from the discarded tin can to brass and bronze parts of steamships being scrapped for obsolescence. The processes used are to a great extent, melting and smelting, the type of furnace required depending upon the type of material, and varying in range from the small iron pot over a gas flame to the 100-ton reverberatory furnace. A considerable volume of secondary or scrap copper, however, is now being returned to the electrolytic refinery for reduction along with the regular intake of that type of plant—blister copper.

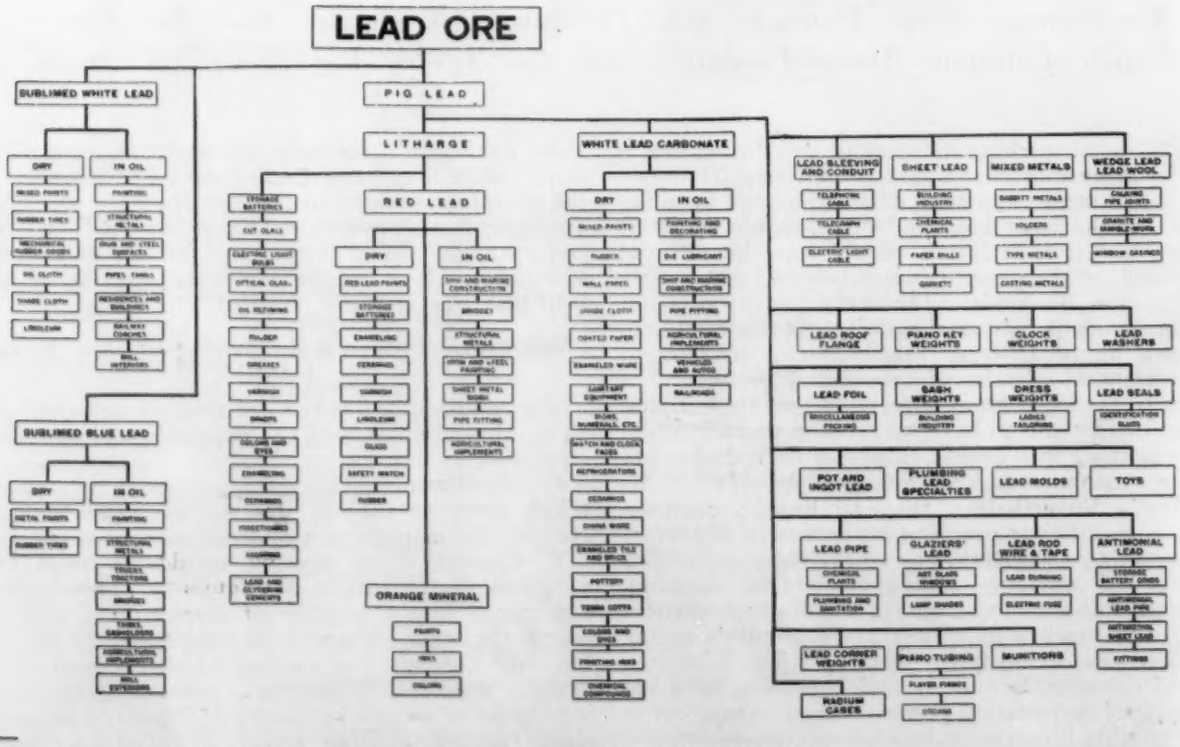
It must be borne in mind that a large part of the above described activities are not carried on independently, but as departments of organizations engaged in the manufacture of specific metal products. For example, one organization may include all six of these divisions, although such companies are, of course, rare. It is often the case, however, that one concern will have a brass foundry, a machine shop, a cutting-up shop and a plating shop. Others may have a foundry and a scrap reclamation plant. Many of the fabricators (rolling mills), have cutting-up departments to make finished products, to which may also be added a plating shop. It is for that reason that accurate analyses are almost impossible to obtain.

Uses and Markets for Non-Ferrous Metals

The first step in a survey of this character is to find out where the markets lie for the raw materials used. At this point we are fortunate in having on hand fairly detailed and clear charts which have been published by several large producers of primary metals. The illustrations show in full detail the various types of products which consume copper, zinc, lead and aluminum, the four most important non-ferrous metals produced in the United States.

The quantities or proportions of the most important non-ferrous metals going into the outlets noted are given below, using the latest figures obtainable.

Lead—From Ore to Finished Product



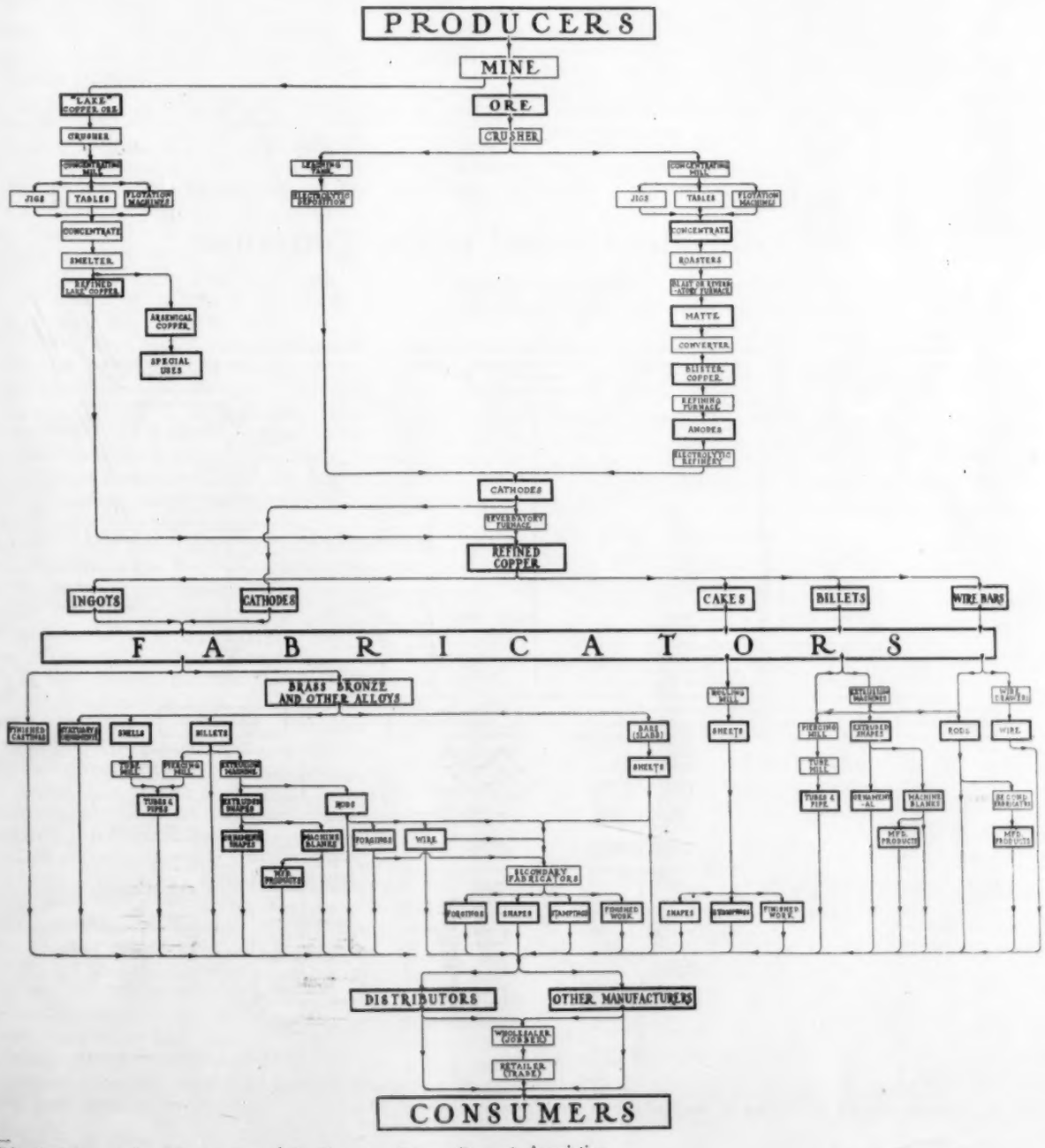
This chart is reproduced through the courtesy of the Eagle-Picher Lead Company, Cincinnati, Ohio.

Estimated Use of Copper in the United States in 1931
(IN TONS OF 2,000 LB.)*

Purpose	1931 Tons
Electrical mfrs. (a)	162,000
Telephones and telegraphs	70,000
Light and power lines (b)	85,000
Wire cloth	4,900
Other wire	55,000
Ammunition	5,000
Automobiles (c)	61,600
Buildings	45,000
Castings, n.e.s. (d)	36,000
Clocks and watches	2,000
Coinage	100
Copper-bearing steel	1,200
Fire-fighting apparatus	1,300
Radiators, heating (e)	1,700
Radio receiving sets	10,000
Railway equipment	1,300
Refrigerators (e)	13,000
Shipbuilding	3,200
Washing machines	1,600
Water heaters, household	1,400
Other uses	40,500
Mfrs. for export	48,200
Total	650,000
Use in pounds per person per year	10.43

* American Bureau of Metal Statistics.

COPPER
AN OUTLINE OF THE PROCESSES BETWEEN ORE AND FINISHED PRODUCT



This chart is reproduced by courtesy of the Copper and Brass Research Association.

Footnotes: (a) Generators, motors, electric locomotives, switchboards, light bulbs, etc. (b) Transmission and distribution wire and bus bars. (c) Does not include starter, generator, and ignition equipment. (d) Bearings, bushings, lubricators, valves and fittings. (e) Included in "Other uses" in prior years.

Estimated Manufacture of Zinc in the United States

(In Tons of 2,000 lb.)*

Purpose	1931
Galvanizing (total)	168,000
Sheets	77,100
Tubes	28,300
Wire	21,600
Wire cloth	6,900
Shapes (a)	34,100
Brass and casting (d)	98,000
Rolled zinc	58,300
Die castings	20,000
Other purposes (b)	34,700
Total	379,300

Footnotes: (a) Includes pole-line hardware, hollow ware, chains and all articles not elsewhere mentioned. The estimates for the use of slab zinc under this head, and also for wire cloth, are probably incomplete. (b) Includes slab zinc used for the manufacture of French oxide, lithopone, atomized zinc dust, die castings (through 1925), wire, zinc for wet batteries, slush castings, and for the desilverization of lead. (c) Included in "Other purposes." (d) Includes all casting other than die casting, slush casting and battery zinc.

The totals in this table for manufacture do not balance with the totals of deliveries ex-smelters, less net exports, owing largely to changes in stocks ex-smelters, but over a period of years the totals for delivery and manufacture are in harmony.

Tin

Although practically no tin is produced in the United States, our use of it is so great (almost as much as the rest of the world together), that the consumption figures are of utmost importance.

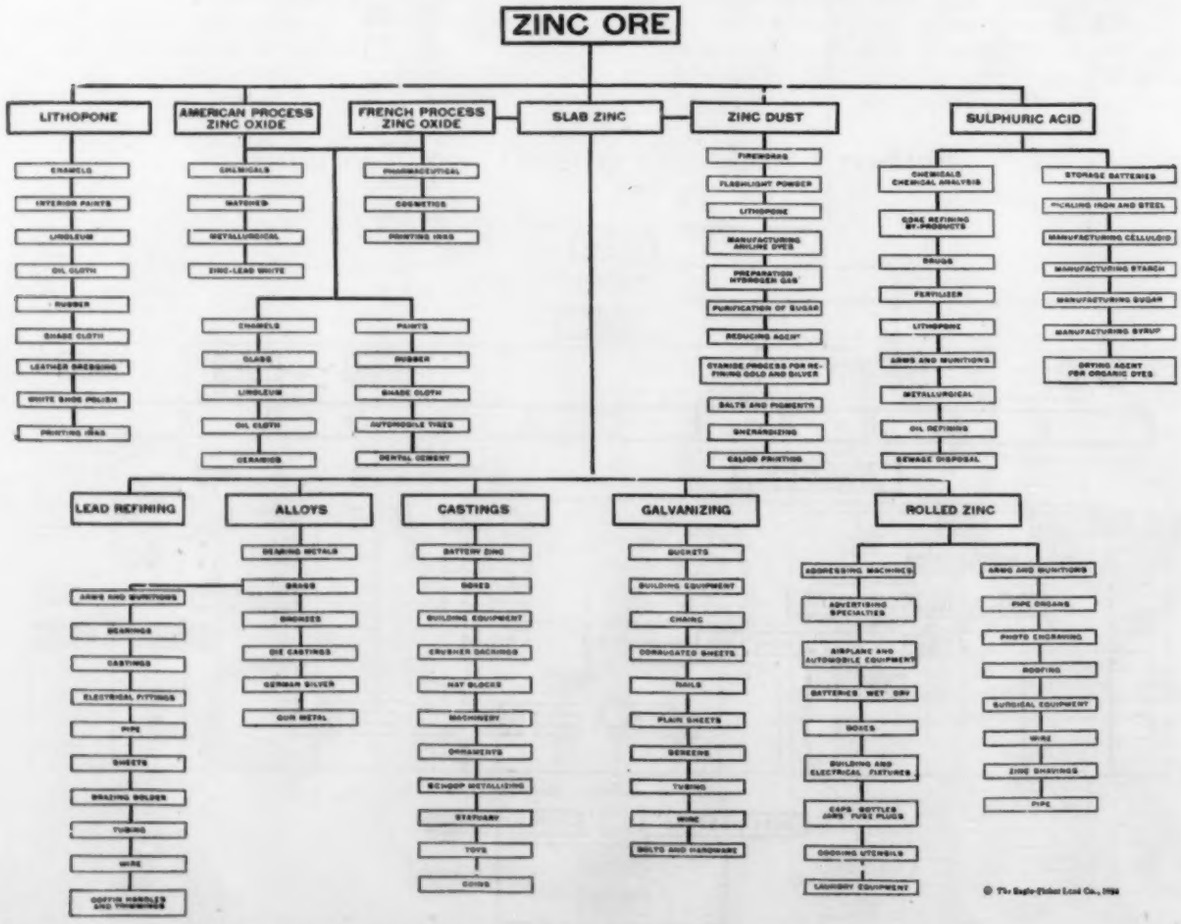
Consumption of Primary Tin in the United States, by Uses, 1930*

Uses	Long Tons	Per Cent
Tin plate and terneplate	27,753	42.40
Solder	11,407	17.43
Babbitt	5,438	8.31
Bronze	3,499	5.35
Foil	3,061	4.68
Collapsible tubes	3,826[1]	5.84
Chemicals	3,268	4.99
Tin oxide	666	1.02
Tinning, brass, copper, tubes, sheets or shells, wire, nails, etc.	2,814	4.30
White metal	1,117	1.71
Type metal	223	.34
Castings	74[2]	.11
Other alloys	306	.47
Miscellaneous	1,996	3.05
Total	65,448	100.00

* From Information Circular 6564, Bureau of Mines, Washington, D. C.
[1]Not comparable to prior years owing to the addition of several consumers whose consumption was not included previously.
[2]Pure tin castings only; in previous years some castings of tin alloys were reported under this heading.

This article will be continued in an early issue.—Ed.

Zinc From the Ground to the Consumer



This chart is reproduced through the courtesy of the Eagle-Picher Lead Company, Cincinnati, Ohio.

The Metal Industries

A Symposium on Their Record in 1932 and Prospects for 1933

Copper

COPPER has spent the past year in successive retreats with the interim spaces occupied in marking time. It has been a disastrous year. Production in the United States has been reduced to what seems to be the barest minimum. At the same time production abroad has not moved in step with our plans. As a matter of fact one of the great African producers has actually increased production.

A conference of all the important producers of the world was held in New York in December and it ended in absolute failure. Its avowed purpose of agreement to reduce production still further was blocked by the demand of Roan Antelope Copper Mines, Ltd., of Rhodesia, Africa, to be allowed to increase its production 80 per cent, because (1) other companies had "breached the previous understanding," and (2) this production was necessary to enable the company to meet its fixed charges, such as interest on bonds, etc. Both sides stood fast and no agreement was possible.

At this time, American production and consumption are balanced at about 300,000 tons per year. Foreign copper is practically barred from the United States by the 4c. per pound import duty laid during the past year, and although the present price of copper, about 5c. is far below cost of production of American mines, it is felt that this price will not continue indefinitely, but will rise to a point where American mines can operate on a reasonable basis in supplying American requirements.

Under the existing conditions, therefore it seems that foreign markets are lost to American copper. Not only can South America and Africa copper be produced more cheaply, but the war that is sure to rage for these markets will go on and keep the price of copper below the possibility of American competition.

It is not unlikely that the American copper producing industry will continue on a fairly even keel, with improvement in general business, as American production and consumption are not far apart, normally. The American refining industry, however, must resign itself to the fact that unless it can make suitable arrangements for refining foreign copper in bond and then reshipping, and also do this work at a highly competitive figure, it must be prepared to retire to about a 50 per cent basis.

A very interesting technical development in copper alloys was made public by the announcement of the American Brass Company, of beryllium-copper alloys, using small percentages of beryllium (up to about 2.50%). These alloys seem to have extraordinary physical properties, which may be increased by heat treatment. The same company has developed a new type of sheet copper, very wide and thin, made by electrodeposition.

An interesting process was developed for putting patina on copper alloys to reproduce quickly the effect of long aging and outdoor exposure.

Zinc

By

A. E. MERVINE

Manager

Metal Division,

New Jersey Zinc

Company

THE most important recent developments in zinc have been in the die casting alloy field. These alloys belong principally to the zinc-aluminum-copper-magnesium group.

Four of these alloys now stand as a group rounded out to meet practically every set of die casting conditions. Zamak 5 and 6 have been the most recent additions, the earlier alloys having already been thoroughly investigated and tentatively specified by the A. S. T. M. and S. A. E.

The complete story of the applicability of these alloys is best shown by the accompanying table of compositions and properties:

	ZAMAK 2	ZAMAK 3	ZAMAK 5	ZAMAK 6
Composition				
Aluminum	4.10	4.10	4.10	4.10
Copper	2.70	...	1.00	1.25
Magnesium	.03	.04	.03	...
Balance Horse Head "Special" (99.99+%) Zinc.				
Patent Numbers	1,596,761	1,779,525	1,852,441	1,852,442
Tensile Strength— Lbs./Sq. Inch	47,300	36,100	41,600	39,600
Impact Strength (Charpy) as measured on ¼"x¼" bar	15.00	18.25	17.75	18.50
Elongation—% in 2 Inches	8.4	4.7	4.2	10.6
Compressive Strength— Lbs./Sq. Inch	93,100	60,500	87,300	91,700
Brinell Hardness	83	62	73	71
Specific Gravity	6.754	6.644	6.675	6.717
Melting Point	733.6°F.	727.9°F.	726.9°F.	731.8°F.
*Relative Fluidity in Sec..	87⅗	60⅖	66⅘	70
**Fluidity Number	114	166	151	143

*Time required for equal volumes to flow through standard orifice at constant temperature.
**Derived by dividing 10,000 by time in seconds to indicate comparative fluidity.

These alloys have enabled die casters greatly to broaden the adaptability of their product. Die cast products in

such varied industries as oil-burners, machine tools and jewelry indicate the vast number of applications. Castings weighing 24 pounds or 1/70th of a pound, with heavy wall sections or sections down to 0.025" indicate the construction possibilities. Used as simple clock cases or complicated parts, the manufacture of which has hitherto entailed much machining and assembling, the economy has proved appreciable, and the quality has met the most stringent specifications.

Much of this progress in the casting industry must be credited to the commercial die casters; and yet the quality of their product is still entirely dependent upon the composition and purity of their zinc alloy. High purity zinc and the development of the four alloys described above have marked a decided advancement in this industry.

Tin

By

C. L. MANTELL, Ph.D.

Consulting Chemical Engineer, Pratt Institute, Brooklyn, N. Y.

THE year 1932 has been another heartbreaking one for the producers of tin metal. Prices remained low throughout the year, in a number of cases being below the cost of production. There has been, at various times, considerable well organized publicity in reference to agreements for control, restriction of production, elimination of surplus, technical developments, research, and the finding of new markets and outlets for the metal. Because of low prices, tin regained some of the ground it had lost to competitive metals in such applications as tin foil, collapsible tubes, and small die castings.

During 1932 restriction of production and international control made further gains in their effectiveness, and additional lowering of permissible production at the various mines was carried through. During the year the net effect of tin pools which attempted to bolster the market was negligible. Many tin consumers laid in stocks of low priced tin almost to the limit of their financial resources.

Tin plate contract prices, announced during the latter part of the year for 1933, made new lows in dollars per base box. Canadian can companies, due to the preferential Canadian tariff enacted during the year, plan to use Welsh plate rather than that of American makers. It is stated that the Welsh tin plate makers will satisfy a demand for about a million boxes of tin plate for shipment to Canada for 1933.

Tin plate was quoted at the end of the year at $4.25 a base box, which became the price for the first part of 1933. This compares to $5.25 a base box in the first part of 1930, $5.00 per base box in 1931, $4.75 in the first part of 1932. In 1931 the percentage of the steel consumption due to tin plate was greater for the first time than that of steel going into rails. It would appear that this relative position will be the same when the 1932 statistics are available.

Severe curtailment of tin consumption, particularly in connection with bearing metals, was very marked due to very low production schedules of the automotive and transportation manufacturing plants. The entire situation, however, is not so dark that it has no bright spots. Tin plating of automotive pistons, mentioned in last year's review, has grown and become standard practice for manufacturers employing cast iron pistons. Type metal and type alloys stood up fairly well, while white metals, particularly Britannia and pewter offered some encouragement in their demands for tin. The year has seen a widening of the vogue for pewter and Britannia metal, often silver plated. Changes in women's fashions has caused new outlets in decorative use of fusible metals and tin alloys in ornaments.

At the middle of December, tin sold at 22.5 cents per pound in New York, and the world's visible supply was of the order of 46,500 tons. Stocks of tin in warehouses in the United Kingdom continue to decrease little by little, the total as of December 10 being 30,141 tons against 32,275 tons on December 3 and a high of about 34,000 tons early in the year. The high price during the year in New York was 25.62½ cents, occurring on September 7, while the low was reached at 18.35 cents on April 14. This compares to a high last year on March 17 of 27.5 cents and a low on December 7 of 20.6 cents.

Lead

By

F. E. WORMSER

Lead Industries Association

THE abnormal course of business in the last three years has brought about striking changes in the relative importance of the various consuming channels of lead. After the year 1921 the electrical applications for lead, that is, the use of the metal in storage batteries and as a sheathing for cable, became the principal outlets. A natural conclusion then was that white lead manufacture would be definitely and probably permanently reduced to third or a lower place in rank of lead consuming industries. Hence it is rather surprising to find that in 1932 the white lead industry again assumed first place in the consumption of **new** lead. The term new lead is used because the storage battery industry uses a larger total amount of lead but the influence of the circulating load of scrap lead derived from old batteries, constantly being reworked, really obscures the actual amount of new lead moving into storage battery consumption—which is less than that used for white lead. The outlook for 1933 is that white lead will continue to be the principal product manufactured from new pig lead, particularly as the cable consumption of lead is expected to be even smaller than it was in 1932.

There seems to be a growing appreciation in the United States of the admirable qualities that lead has for archi-

tectural work, the metal being found on more and more buildings of a monumental character, mainly in the form of an antimonial-lead alloy. Lead-coated copper has also been meeting with an excellent reception in sheet metal work. When all is said and done lead gives a patina on outdoor exposure which improves with age and is non-staining in quality. The patina of a metal is a factor often overlooked by architects. It is quite noteworthy that some of the newer and bright metals which have proved quite popular in the last few years are noticeably lacking in an attractive patina after a few years exposure.

A new type of ornamental lead grille has been developed in which sheet lead, stamped or worked to whatever design desired, may be enclosed between two sheets of glass. This type of construction reduces the cleaning costs of grille work.

A new standard of lead pipe sizes and weights was adopted by the principal manufacturers of lead pipe in the United States in 1932, a standard which is scientifically based upon the creep strength of lead.

Lead is also being used in the cold drawing of steel rods and tubing as a lubricant during the drawing operation.

A new engine packing, consisting of a lead tube enclosing a core of flax and graphite, has also been placed upon the market and has met with an excellent reception in automobile motors.

Research on the acoustical problem of sound and vibration dampening seems to indicate that the weight of doors and partitions is an important, if not governing factor, on the reduction of noise transmission. This would indicate the possibility of a wider use of lead in the acoustical treatment of buldings for sound deadening.

The lead weighting of silks assumed prominence during 1932 and promises to increase in importance owing to recent technological developments which make lead weighting economically attractive through the use of a lead phosphate.

Impregnating wood and other porous materials with lead seems to have passed the experimental stage. The resultant product has a metallized appearance which may find an outlet in building construction.

Impregnating cloth with lead acetate is a recent development for lining chests of silverware in order to reduce the tarnishing of silver. The cloth absorbs the hydrogen sulphide tarnishing agent and has to be renewed periodically.

In the type metal field stereotype metals are finding wider application for color printing.

Aluminum

By S. K. COLBY

Vice-President, Aluminum Company of America

DESPITE the decline in the output of aluminum in 1932, the aluminum industry has made substantial progress in the form of many important constructive developments and the further expansion of new markets. While the results of industrial research have not been of sufficient magnitude to offset the reduction in the use of aluminum in many industries, they have tended towards minimizing it and point with encouragement to the immediate future.

The applications for aluminum in building construction continue to be one of the most productive of the newer markets for the metal and many of the buildings now being erected throughout the country are employing aluminum for a wide variety of architectural purposes. The lightness of the metal, its high degree of resistance to atmospheric corrosion and its non-drip-staining characteristics offer definite economic advantages to the building owner, while its availability in practically all forms known to the metal working art gives the architect unusual freedom in the execution of his motif.

The principal use for aluminum is, of course, in the various branches of the transportation industry, and while the tonnage of aluminum used in certain branches has shown a decline, notable gains have been made in others, particularly in the use of the metal in the rolling stock of railroads and railways and in the bodies, chassis and cabs of motor trucks and buses. Practically all types of motor haulage equipment are now constructed of aluminum and there has been a marked broadening of interest in the use of aluminum for weight reduction in railroad rolling stock. The all-aluminum car construction, announced at the American Electric Railway Association Convention in 1931, has been followed by a more general acceptance of the suitability of aluminum for electric locomotives, tank cars and hopper cars. A Pullman and a de luxe passenger coach are now being completely aluminized, and toward the end of 1932, a light, streamlined railcar, constructed almost entirely from aluminum, was placed in operation.

An interesting structural application for the strong aluminum alloys is found in the aluminization of dragline excavator booms. The aluminum boom, as a result of its longer reach and greater capacity, enables the operator to reduce operating costs and increase construction speed. It has proved its dependability and economic value in the past year's operations on the Mississippi River levees, in coal mining in Pennsylvania, and in highway and irrigation projects in the West.

The past year has witnessed increased activity in the construction of sewage disposal plants. While concrete is employed as the basic structural material in plants of this nature, metal finds extensive application, and because of the highly satisfactory performance of aluminum in past installations, it has found wide acceptance in present-day sewage plant construction.

The use of aluminum foil for insulation purposes has been extended, during the past year, because of the light weight, cleanliness, ease of installation and low cost of this type of material. It has been employed in the insulation of many different types of transportation vehicles and, since it permits the use of a lighter and thinner wall, the building industry has looked upon it with favor. For the same reason, an electric refrigerator manufacturer has employed it in the construction of refrigerator cabinets.

The applications for aluminum in the dairy industry have materially increased as a result of the development of cleaners and sterilizers designed primarily for use with aluminum. While the outstanding commercial development in this field was the complete outfitting of a number of dairies with aluminum equipment, there have been many installations on a smaller scale throughout the country, including not only the equipment in the dairy but the truck tanks and containers used in transporting dairy products.

Aluminum, colored by chemical and electrochemical processes, is rapidly gaining favor as a packaging and decorative material. The many different color effects which can be obtained with the metal and the hardness imparted to it by these processes have made aluminum an ideal material for various types of containers, house-

hold and office appliances, chairs, lamp standards and a wide variety of decorative articles.

During 1932, a number of new aluminum alloys were introduced to fulfill the requirements of certain branches of industry. The increasing use of aluminum for window frames, subframes and sills resulted in the development of an aluminum alloy which combines the properties essential for this type of material. The alloy can be easily formed and welded and possesses good mechanical properties and a high degree of resistance to atmospheric corrosion. Of interest to the aviation industry was the development of a new high strength duralumin type alloy. When this alloy is employed as the core material for the Alclad products having integral surface layers of high purity aluminum, their tensile strength is increased approximately ten per cent.

Nickel and Its Alloys

By

ROBERT C. STANLEY

President, The International Nickel Company of Canada, Limited

THE nickel business has become one of the basic industries of the world, which rise and fall with the tide of general business. This is demonstrated by the low point which nickel consumption reached last spring, and by the slow but persistent recovery which it has experienced in the last few months. Whether it will continue this advance in 1933 thus depends on what fate has in store for world business as a whole.

World consumption of nickel for the first nine months of 1932 slightly exceeded 40,000,000 pounds, as compared with slightly more than 56,000,000 pounds for the same period in the previous year. Despite this decrease in total volume, four nickel alloys have shown this year increases in use over the figures for 1931. Two of these were nickel cast iron alloys, another was nickel-clad steel plate, and the fourth was a special chrome-nickel alloy developed for dairy use.

Nickel and Beer

In this connection the current agitation for the legalization of beer in the United States may have a bearing on the future of nickel. During the past twelve years that American breweries have been marking time, progress in the technology of brewing has been made in Canada and Europe, and the trend is definitely toward the white metal alloys for fermentation vats, storage tanks, shipping containers, piping and various other equipment.

Pure Nickel

The wide variety of industries which pure nickel now serves was emphasized during 1932 by the relatively large tonnages going into two such entirely diversified fields as alkali, rayon and plastic manufacture, and the construction of radio tubes. The metal has found its chief applications in the chemical, dairy and food products industries.

Advances in the technique of making seamless tubing of pure nickel are building up another market for nickel, particularly in the chemical field. A considerable quantity of this tubing was sold during the year for caustic evaporators; a copper-free caustic is necessary to make rayon.

Nickel Plating

Nickel-plating continues to require about 5 per cent of all the nickel produced. In line with developments during the past few years, nickel for plating is benefiting from the public demand for white decorative surfaces. Where chromium plate is used, a heavier nickel deposit is required as an underlay.

There have been technical advances in plating during the year. Work has been done at high temperature and low pH. There has been developed in France a hot single sulphate bath operated at high current densities with a conveyor system further to reduce operating costs. We now have simultaneous electro-deposition of alloys from a mixed solution.

Miscellaneous

There has been an increasing diversification of the uses of nickel for miscellaneous purposes.

A greater interest in powder metallurgy was noted in 1932. It is being disclosed that economies of production of many parts can be achieved by combining metals in their powdered state, pressing them in dies and subsequently applying heat-treatments. Some alloys which are not possible by melting can be made with powdered metals.

The use of nickel salts in electroplating has continued

Nickel alkaline batteries have been the subject of much research since the perfection of the Edison battery. There was considerable activity in England in developing such batteries for train lighting and battery trucks. In France, a new type of storage battery—a nickel-cadmium alkaline cell—was developed for trucking and train lighting.

The use of pure nickel for coinage has increased. Up to the present time some 24 countries have issued about 3,000,000,000 pure nickel coins.

Monel Metal

(Approximately 67% Nickel)

The many purposes to which nickel alloys are now being applied were illustrated during the year by the expanding use of Monel metal for both industrial and domestic purposes. The development in 1931 of a Monel metal kitchen sink was followed by a marked extension of activities in this field.

Monel metal also went into the cellar of the home. A domestic hot water storage tank of welded Monel was another development during the year, which has opened up new markets for this nickel-copper alloy.

Research resulted in the production of Monel metal bars of increased tensile strength. In connection with certain bars produced for large dam work in the United States, a tensile strength was achieved of 95,000 to 100,-

000 lbs./sq. in. on forgings from three to six inches in diameter. Elongation value on this stock was well over the 25 per cent required. Several propeller shafts for motor vessels were produced which had an ultimate breaking strength of more than 100,000 lbs./sq. in.

In textile and chemical plants there has been an increase in the use of this alloy. Interest in Monel metal as a roofing material was stimulated by the results of an examination of the roof on the Pennsylvania Terminal in New York City. On the basis of laboratory tests of samples of this roof, which was installed in 1909, metallurgists indicate a life of three centuries for this material in the atmospheric conditions of New York.

Among other uses of Monel metal may be mentioned: an extension in the use of this material for handling and canning sea food, such as shrimp and oysters, and for lining fish holds and chutes on boats; perforated Monel metal spindles for package dyeing of yarn and thread; used by laundries for identification tags, with one laundry alone taking a considerable quantity of the metal to make 100,000 tags; development of Monel metal sausage and bologna molds, and comb type bacon hangers.

Further interest was developed for Monel metal seamless tubing through extension of the sizes in which it can be made. Outside diameter limits have been increased from 2¼ inches to 4½ inches, and its wall thickness has been extended from a range of .035—.180 inches to .025—.300 inches. In other words, it can be made in larger diameters and in thinner and thicker sections than formerly. This tubing is now being used for dye sticks in the textile industry, and for pipe lines in food, bottling and canning plants. In European beer dispensaries, seamless Monel tubing is being widely used for cellar piping.

Inco Chrome Nickel

(80% NICKEL)

Developed a year ago by the International Nickel Company, this alloy containing approximately 80 per cent nickel and 12 to 14 per cent chromium, has found a definite place for itself in industry. It is known as Inconel.

Welding Rod

The welding of high nickel alloys has been revolutionized by the development in International Nickel's research laboratories of an improved electric welding rod. Welding of these alloys, notably Monel metal and Inconel, as well as of nickel and nickel-clad steel, is rapidly replacing other forms of joints.

Solid Nickel Silver

(5%—30% NICKEL)

Demand for certain forms of solid nickel silver increased during 1932 due to recognition of their qualities by designers, and to improved technique of handling the material in foundry, rolling mill and extrusion plant.

Castings in sand have been made for more than 20 centuries—the earliest known form of nickel silver is the Chinese **pakfong**—but a broader appreciation of this alloy's casting possibilities in the foundry was achieved during the year, and many of the casting difficulties were ironed out. Cast nickel silver went into the highest grade plumbing fixtures, marine and building hardware, decorative trim, milk and food handling equipment, and in cast fittings for ice cream freezers.

Extruded sections largely comprise those utilized in architectural fabrication, where effects are obtained with metals which permit the architect to obtain a color scheme and design which can be readily handled by fabricators. More than 2,000 different shapes are available from producers, and these, in combination with castings, have made possible the production of greater quantities of nickel silver for architectural hardware, ornamental grilles, etc.

Another field which offers interesting possibilities lies in the hot-forging of white metal alloys. These have been developed during the past year for use as miscellaneous parts in hardware, plumbing fixtures, and decorative material, as well as in certain places where the higher strength values of forged nickel silver are desirable. Following along with this is pressure casting in fixed dies, formerly worked only in brass but now extended to certain of the nickel silver alloys.

The automobile industry became interested this year in nickel silver forgings for automobile hardware in the higher priced cars to be used bare for interior work, and chromium-plated for exterior work.

Cupro-Nickel Alloys

(15%—50% NICKEL)

Copper nickel alloys, containing 20 to 30 per cent nickel, are being used more extensively in marine work. More than 300 ships now are fitted with cupro-nickel condenser tubes, including the new liners—S. S. Manhattan and Conti di Savoia. These tubes have eight years of experience behind them.

Condenser tubes of copper-nickel alloy also show promise of longer life in steam turbine power plants.

Nickel Brass and Bronze

(½%—5% NICKEL)

Engineering demand for greater physical qualities in the aluminum bronzes, the manganese bronzes and other special mixes, has led to the introduction of nickel to achieve the desired results.

Throughout the world, a wide variety of brasses and bronzes are in use. Demand for higher density, soundness under pressure and increased physical properties has enhanced the position of nickel with respect to these alloys.

Almost all the requirements of bronze casting users can be met by less than a dozen mixtures. In these typical mixtures, nickel additions in amounts of ½ per cent to 2 per cent improve the properties of these alloys, and maintain the distribution of lead in high-lead and copper-lead alloys. An increase of 25 per cent in proportional limit and from 25 to 40 per cent in Izod impact value, is not uncommon.

A nickel bronze, of a gold yellow color, having a high tensile strength, has been developed, and is available in the form of rods or shapes as extruded or cold drawn. This alloy will also forge on brass forging equipment, and is used where the strength and corrosion resistance of brass is not sufficiently high.

Heat Resistant Alloys

(35%—85% NICKEL)

While the demand for heat-resistant alloys was restricted during 1932, the base of consumption was further broadened. On the one hand, there has been a trend toward increased use of these alloys in modern furnace construction to replace refractories.

On the other hand, increased use of domestic electrical appliances has put the nickel-chromium alloys in more homes and in more places in the home. This electrical resistance wire is the heating element for electric toasters, percolators, ranges, irons, etc. Improvements in production technique have added life to these heating elements, so that designers of electrical apparatus have been encouraged to make greater use of them.

The Precious Metals

By

G. H. NIEMEYER

Vice President, Handy & Harman, New York.

NO figures are available indicating the amount of gold used in the arts and industry during 1932, but no one will dispute the fact that less gold was used for these purposes than in any year since the yearly consumption was recorded by the Director of the Mint, which dates back to 1911.

We estimate the world production of silver at 160,600,000 ozs., which compares with a production of 192,700,000 ozs. during 1931. The United States supplied 23,400,000 ozs., Mexico 71,700,000 ozs., Canada 18,300,000 ozs., South America 12,400,000 ozs. The production in the United States is about 7,500,000 ozs. lower than it was in 1931 and is the lowest recorded in any single year.

The consumption of silver in the United States and Canada we estimate at about 22,000,000 ozs. or nearly 28% below the consumption for 1931. The use of silver for silverware was, as usual, the largest single factor of consumption. The amount used for sterling silverware showed a falling-off of about 10% below last year, which decline is largely due to the decrease in the sales of sterling silver hollow ware, as the ounce consumption of sterling silver flatware was practically the same as in 1931. The ounce consumption of silver for silver plated wares showed a falling-off of about 40% below 1931. The chemical industry (which includes motion picture film) used about 15% less, and the amount used for jewelry and dentistry showed a decline of about 33 1/3%, while silver used for industrial purposes, such as silver solders, silver alloys, etc., showed a falling-off of nearly 50%.

The highest New York Official price during 1932 was 31c per ounce reached on February 23rd and 24th and March 1st. The new all time low for silver of 24¼c was quoted on December 29th, while the average New York Official price for 1932 was .27892.

Secondary Metals

By T. A. WRIGHT

Lucius Pitkin, Inc., Chemist - Metallurgists, New York.

FROM the viewpoint of economics, secondary metal like most everything else has been subject to marked decrease in volume. Battery lead has kept up fairly well in tonnage, but most other important items in both white and red metals have felt the marked slackening of industry.

Many items have had a decrease out of proportion to the whole. Foundry ashes and skimmings, for instance, have not been produced in any great quantity, and in addition have not found their way back to the refinery as the low price of the constituent metals has not warranted it.

During the early portion of the year, there were considerable quantities of high grade copper, such as copper wire, shipped due to continued dismantling of trolley lines, but that has also shown a marked downward trend lately.

During the early portion of the year, too, there were a number of abortive efforts of small dealers of scrap metals to enter the smelting game by way of battery lead and other white metal scrap products. On the whole, however, the tendency has been to concentrate still further the ultimate refining of scrap by its diversion along a shorter economic path to intermediate alloys such as nonferous ingot and solder, as produced from radiators.

An interesting development of the year was the taking over of the Federated Metals Corporation by The American Smelting & Refining Company. The effect of this innovation will be watched with interest during the course of the next few years.

Some of the work that has been done at the Bureau of Standards by the Research Associate of the Non-ferrous Ingot Metal Institute has been released for publication, the subject of the first paper being on the influence of pouring temperatures on the Standard 85-5-5-5 Alloy. Of course, the several changes proposed in the specifications for copper base alloys, A. S. T. M. designation B-30-31T, are also of interest from the viewpoint of secondary metals.

During the past year also, lead has been the subject of continued interest from the viewpoint of producing soft lead from antimonial material. In one case, this has been along the lines of furnace design for the production of lead oxide and in another by what might be termed a "chemical treatment" of the lead bath.

Efforts are being made to introduce a new rust-preventive paint which has met with considerable success abroad and which is based on the use of certain types of secondary metals employing a charge of 83% lead, 13% antimony and 2% tin.

A grade of zinc oxide, said to be suitable also as a paint pigment, has been produced from zinc scrap including certain types of zinc-base die casting alloys which at times are a drug on the market otherwise.

A very important development, however, has been the release of methods of analysis for secondary aluminum and tentative methods of sampling for the same material. These methods have been published as the result of the work of the Aluminum Research Institute and their consulting chemists and are now the subject of study by the American Society for Testing Materials in connection with the tentative methods of analysis for aluminum and light aluminum alloys published some eleven years ago.

A marked increase has been shown in the use of the Spectrograph in detecting, identifying and determining residual amounts of metals present as added elements or as impurities. Past work in this country which had been confined mainly to aluminum and wrought brass alloys has now been extended to white metals and brass ingot.

The Brass Foundry

By

H. M. ST. JOHN

Associate Editor

LAST year's review of the brass foundry industry could almost be repeated for this year's reading except that portions of it should be printed in italics. It can no longer be said that labor rates have been maintained at or near the previous level but it is still true that foundry managements have done everything possible to accomplish savings by other means before calling on labor to contribute its share in the achievement of lower costs. The adoption of technical economies has now progressed about as far as it can go in the present state of the art so that, more nearly than ever before, those brass foundries which have so far been able to weather the storm are making use of the technical and scientific improvements which had previously been adopted by only the more progressive establishments.

Complete modernization has, however, been somewhat retarded in cases where it could only be accomplished by a considerable expenditure of capital. It is also true that the cost of metals and other raw materials has decreased out of proportion to the smaller decrease in the cost of labor. Improved manufacturing methods which owe their value principally to savings in raw material have consequently made less progress than those which save labor directly or, indirectly, by reducing the percentage of scrap. New electric furnace installations (in the brass foundry) have been few and far between. Although electric melting does commonly reduce labor costs, both direct and indirect, a large part of its savings, in more usual times, is based on decreased metal losses, now of much less importance. Electric furnaces are expensive to install and not particularly economical when they must be operated intermittently.

The low price of prime metals has greatly increased their use by the average foundry and stocks of secondary metals and metal-bearing wastes continue to accumulate, their value for foundry use not equal to the cost of the labor necessary to convert them.

Permanent mold casting in brass has been adopted more generally in Europe than in America but is not being entirely neglected here. This process is likely to make very rapid progress when it once gets a fair start. Many of the early mechanical difficulties in the Polak and other processes have been overcome. The progressive foundryman will do well to lay his plans now to take advantage of this and other developments which, within a few years, are likely to entirely transform the sandcasting foundry as we now know it.

Attendance at the American Foundrymen's Association meeting in Detroit, with not even a limited exhibition to enhance the attraction, was gratifying and marked with particularly keen interest in the progress which has recently been made in the study of casting shrinkage for various nonferrous alloys. There was a further contribution to our knowledge of the influence of nickel in red-brass and bronze alloys. The nickel-silicon bronzes and other copper alloys which can be hardened and strengthened by heat treatment also attracted attention in discussion, as a new type of product for the brass foundry.

The Brass Rolling Mill

By

WILLIAM J. PETTIS

Associate Editor

THE brass mills, at the end of 1932, completing some three years' struggle for survival, have not furnished much material for a picture of any major developments in the way of rolling mill equipment.

The last ambitious work of this kind occurred in the Rome mills several years ago, and with it has come a general acceptance of the new type of mills, used as single units or in tandem.

We look forward to new and interesting developments in proposed new mills, when the time is ripe for spending money on new projects. While plans for new mills have been shelved until business shows a definite upward trend, much worth-while progress has taken place.

Strip annealing has come in for considerable discussion, because of the demand for better standards of finish and quality of metal used for deep drawing operations. In strip annealing the ribbon of metal is exposed to the hot gases on both sides as it passes through the heated chamber. A variable speed control of the conveyor gives the desired time exposure. This gives uniformity of temper, and with "controlled atmospheres" the desired softness is obtained with a minimum grain growth, an ideal condition where the metal is subject to severe distortion in the fabrication process.

While many of the new strip annealing furnaces have functioned perfectly in the heat treatment of the metal, they have failed because the metal was marked or scratched. This defect has been corrected by some of the leading manufacturers of the furnaces.

Considerable research and development work has been done with "atmosphere" and applied on small non-ferrous parts, with special gases for the protection of strip metal surfaces during the heating and cooling of annealing operations.

The trend has been away from quenching metals with water.

As applied to the non-ferrous metals there are two types of annealing. "Clean annealing" may be applied to a process of annealing without oxidation, but without a

uniform surface color. This can be corrected by pickling. "Bright annealing" may be annealing without oxidation and a uniform surface color. The copper-zinc alloy, presents more difficulties in this treatment than copper does.

A novel installation embracing the "controlled atmosphere" feature is a billet furnace, built by the Rockwell Furnace Company. The billets enter the furnace through gas seals, and is not again exposed to the air until after extrusion. The furnace has a capacity of 22,000 pounds per hour. A special strip annealing furnace was installed to meet the requirements of a mill that is handling copper strip in 600 pound coils.

Word comes from the Naugatuck Valley that nickel silver is being hot rolled, successfully. This is a revolutionary practice. Another Valley mill is working on a process of producing copper zinc alloys in strips by flowing the molten metal through the rolls. The process is more intricate, but that expresses the general idea.

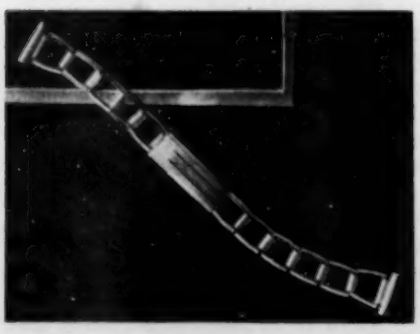
Oil is demanding attention again, as an efficient fuel, through the treatment by modern methods and new types of furnaces. It has suffered somewhat by comparing modern gas and electric furnaces with old and obsolete oil fired furnaces.

Jewelry Making

By C. M. HOKE

Consulting Chemist, The Jewelers Technical Advice Company, New York.

NATURALLY enough, a luxury industry such as the making of jewelry has suffered severely during the depression. The allied lines, which include the making and repairing of watches and clocks, silver-

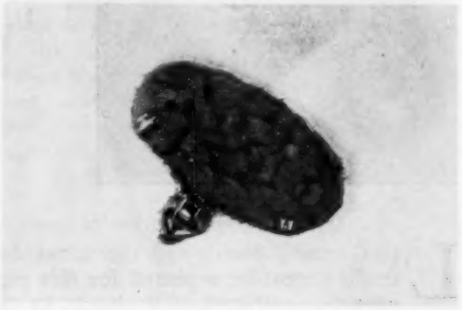


A New Bracelet Made in the A & Z Chain Company Factory, Providence, R. I. They Are Made in Chromium, Sterling Silver (Rhodium Plated) and Gold Filled.

ware, the optical lines, novelty jewelry, and "gift" goods, have served to keep a good many jewelry shops afloat, but they also have been depressed.

A severe blow was the Federal Tax, levied in the middle of the year, on jewelry and watch parts. This tax has apparently had an inhibiting effect, partly because of the added cost, partly because of the confusion as to the exact meaning of the law. At any rate, the revenues returned have been considerably less than were originally estimated.

One effect of this tax was to encourage the manufacture of inexpensive articles—those not subject to tax.



A Striking Bit of Jade from the House of Walter Lampl, New York.

Several manufacturers who previously had made jewelry of medium or expensive grade, have entered the low-priced field.

From the fashion standpoint, we observe that the Victorian influence is still in the ascendancy. Ornate carvings, floral motifs, massive designs, are all in high favor. Chains with heavy links are seen again after a generation of absence; this is true of all types of chains—men's watch chains, women's necklaces, and the bracelets used with wrist watches.

Yellow gold has been completely restored to favor. For daytime wear it is the approved metal. The white of platinum is preferred for the evening, of course. Sports jewelry, at present an important element in fashion, shows a wide variation—all shades of gold, alone or in combinations; and designs from every school of art, with special emphasis on the bizarre. Among the materials used in sports jewelry we see copper, aluminum, colored plastics of the Bakelite family, the usual glasses and enamels, and brightly colored stones of all kinds.

The fact that the price of diamonds has recently risen is subject to two interpretations; either it is evidence of recovery from depression, or (perhaps) merely the result of extremely low production and virtual stagnation in the diamond cutting shops of Amsterdam.

Colored stones—emeralds, rubies, sapphires—rival the diamond in popularity. Among the semi-precious stones, the more brilliant the color the greater the vogue. Carved stones are again in favor; jade, amethyst, lapis lazuli and carnelian especially; usually they are mounted simply in yellow gold.

The electrodeposition of rhodium is now a well-established process in a good number of plants. After years of litigation the chromium-plating patent suits seem to be on the way to settlement. These two developments are sure to be of benefit to the jewelry world.

One by-product of the depression is activity in the marketing of old precious metals. With the drop in commodity prices, gold is relatively more valuable, and many jewelers have profited through the purchase of old jewelry, or through exchanging customers' old gold for new articles.

It seems now that any business recovery will be communicated promptly to the jewelry industry, many people feeling that jewelry is a better investment than stocks, bonds, or mortgages.

Plating and Finishing

By

Dr. A. K. GRAHAM

Associate Editor

IN the year 1932 was found the answer to the question which had been raised by numerous individuals interested in the electrodeposition of metals since the advent of chromium plating—of what value was Fink's patent on chromium? A district court for Connecticut and the United States Circuit Court of Appeals for the Second Circuit both upheld the Fink patent in every respect and a petition for a rehearing of the case was denied by the latter court. Whether the matter is definitely closed depends upon the decision of the United States Supreme Court on the defendant's appeal.

Other than the interest manifested in the legal proceedings incident to the chromium litigation little attention has been paid to chromium deposition as compared to the published results of past years. One study reported upon in METAL INDUSTRY, Vol. 30, page 272, compares the lead and lead antimony anodes for chromium plating. It was concluded by the authors that "the antimony content in lead anodes from 0 to 12 per cent does not seem to have any effect on the ratio of hexavalent to trivalent chromium in the plating solution." It was further concluded that "antimony in the anode increases the rate of corrosion in continuous plating while it decreases the solution rate in plating when an intermittent cycle is used."

Another paper deals with the effect of base metal upon the service which chromium plating will offer when applied to dies. The thought expressed by the author that the failure of chromium in such applications is due to the flowing of the base metal beneath the deposit as the result of fiber stresses in excess of the elastic limit of the base metal is worthy of serious attention.

Next to chromium, the outdoor exposure tests on plated coatings which are being conducted under the joint committee of the American Society for Testing Materials and the American Electroplaters' Society through their research associate at the Bureau of Standards in Washington, is the second item in importance to the industries interested in electroplating. While the results of these tests are not sufficiently complete to justify drawing any extensive conclusions, preliminary data show that it is impossible to anticipate the degree of protection which a given coating will afford, and the Preliminary Progress Report which will shortly be released for publication contains some very significant facts regarding the protective value of composite electrodeposits. Certainly the results are of such vital interest and importance that the request for financial support from the industries is one which should be answered without delay. To discontinue this research at this time would not only mean a loss of considerable money which has already been invested but would delay indefinitely the time when results obtained from outdoor exposure tests conducted under similar conditions would be available. Furthermore, little intelligent progress can be made in the protection of metals against corrosion by electrodeposits until such data is obtained.

Tungsten plating may well occupy the next position of importance in reviewing the year's developments in the plating industry. While it was claimed by Fink and Jones in 1931 that tungsten could be successfully deposited from alkaline aqueous electrolytes, as late as June, 1931, Kahlenburg reported no success in attempting to plate tungsten from aqueous solutions. However, patents have recently been granted to Fink for a process in which it is claimed tungsten can be successfully plated from water solutions on a practical scale. This development may be of considerable significance in the future when one remembers the results of the first patent on chromium plating.

A new anode for zinc plating consisting of an alloy containing about 0.5 per cent aluminum and about 0.3 per cent mercury has been developed during the year. Among other things, this anode is outstanding in that it eliminates the over-efficiency at the anode associated with sludging, which is so objectionable when acid plating with pure zinc anodes, and furthermore, maintains the acidity of the acid-zinc bath at practically a constant value. In cyanide solution, the anode is also sludge free but has the added advantage of possessing a lower anode polarization than other available zinc anodes. The deposits obtained with the alloy anode from both acid or cyanide solutions are excellent and superior in protective value to those obtained with a pure zinc anode. This development is described in a paper appearing in Vol. 62 of the Transactions of the Electrochemical Society and is covered by U. S. patents No. 1,888,202 and No. 1,887,841.

Other papers of importance on cyanide zinc plating have appeared during the year. Oplinger discussed very thoroughly the factors involved in barrel plating from a cyanide zinc solution in his address before the platers' convention in June. Soderberg, also discussing barrel plating, emphasized the economical importance of accurately determining barrel plating costs and suggested how one could proceed to obtain such figures.

Dr. L. C. Pan, on pages 403 and 438 of Vol. 30 of the METAL INDUSTRY discusses the results of his investigation of the four methods of analysis now in use in the analysis of free cyanide in brass plating solutions. His interesting conclusions are reported below:

"Among the four methods of analysis of free cyanide in brass plating solutions, the Liebig method gives consistent results, checking very closely with the theoretical values of free cyanide, but the end-point is not sharp.

"Small amounts of potassium iodide added to the brass solution for titration against silver nitrate improves the end-point, but throws it off the correct position.

"Titration against silver nitrate with a large amount of potassium iodide as indicator gives the sharpest end-point and results most close to the theoretical values. This method shows the least interference by the presence of ammonia and carbonate and by the zinc content.

"Titration against standard copper sulfate solution gives apparently sharp end-point and very consistent results at a slight deviation from the theoretical free cyanide values, but the end-point lags in time, so that it is necessary to allow 15 to 20 seconds after each addition of the reagent for the equilibrium to restore.

"In all these four methods, dilution plays an important part. All analyses should be made at a fixed volume. If potassium iodide is to be used as indicator with silver nitrate titration, it should be added in fixed amounts, preferably making its concentration to 0.37 N."

Further developments have been reported in the lacquer industry and in the anodic oxidation and coloring of aluminum, which were the subject of several papers at the Electroplaters Convention in June, and show that the trend is toward better quality and superior products.

In conclusion, one must point out that further emphasis is being placed upon the importance of the proper preparation of base metals for electroplating and of the influence of the base metal itself upon the results which are obtained. One very interesting paper appearing on page 59 of Vol. 30 of this journal discusses this matter very thoroughly, laying special emphasis upon the importance of electrolytic pickling. Another article, appearing on page 440, Vol. 30 of this journal, also deals with this important subject.

New Platinum Plating Process

THERE has recently been introduced into Birmingham, the home of the electric plating trade in Great Britain, a new process of electroplating with platinum, which is confidently expected by its promoters ultimately to supersede chromium plating for table wares, articles of utility and ornament, says a report received here from United States Consul G. A. Makinson, Birmingham, England.

The process is the result of experimental work which has been carried on for a number of years, and has only recently become a commercial practicability.

Some of the principal advantages claimed in respect to platinum plating are its retention of an untarnishable luster with a minimum of attention; the simplicity of its process, as compared with other forms of plating—especially chromium; the toughness and uniform thickness of the platinum deposit, which thickness can be varied to suit requirements.

The platinum solution is made by dissolving platinum plating salts in water. Platinum plated anodes are used, and plating is carried out at 6 to 8 amperes per square foot at voltages of 2 to 10 according to the size of the article to be plated. Plating salts are added to the bath when impoverished.

While the comparative cost of the installation is high, this cost is said to be counterbalanced by the quickness and facility of the plating process, the small overheads, and the superior merits of the ultimate finish as compared with other forms of plating. Furthermore, the platinum can be deposited directly upon the base metal without the necessity of previous plating.

The Consulate is informed that the platinum solution costs as much as £21 per gallon. Chromium solution is obtainable for about 6 shillings ($1.46 at par of exchange) per gallon. However, whereas with platinum plating the process takes approximately 4 minutes, chromium plating involves a period of about two hours—one hour being for previous nickel plating before chromium plating can be successfully deposited.

It further appears that electrical current of only two horsepower is required for platinum plating in a 4 foot tank of solution, while as much as 17½ horsepower current is required for chromium plating in a tank of similar size, in other words, that in similar conditions platinum plating requires only 7.5 amperes per square foot and chromium plating 100 amperes per square foot. From these comparisons it is stated that 90 per cent of the platinum plating represents the cost of materials, and only 10 per cent labor.

At the present time platinum plating is principally done on silver and electro-plate, although it has a wide field of service as applied to base metals such as nickel silver, brass, copper, etc.

The cost of installation of a small platinum electroplating plant is said to be in the neighborhood of £2,000. Few of the electroplating and jewelry manufacturing firms in Birmingham are in a position to risk such an outlay at the present time. It develops, therefore, that, at this stage, firms who have equipped themselves with the new process primarily handle orders for platinum plating from other smaller firms, rather than for their own account. One local firm has already installed platinum electroplating apparatus and states that its charge for work submitted by outside manufacturers varies from one penny to two-pence (2¢ to 4¢) per square inch of surface. The increasing popularity of the new finish will no doubt ultimately encourage the individual installation of a number of these plants.

The patentees of the above mentioned platinum process are Johnson Matthey & Company, Limited, of Hatton Garden, London, E. C. 1, England, with branch works at Victoria Street, Birmingham, England.—A. E.

Removing Zinc From Aluminum

Q.—We are writing you to inquire whether you could give us any information as to how to remove zinc from aluminum. We thought that perhaps you might know of some method or some flux.

A.—The removal of zinc aluminum is difficult. The one most commonly used is to burn out all you can in your reverberatory furnace, using a flux of salt and cryolite—

90% salt
10% cryolite

and rabble the metal with a rabbling iron, heating the metal up to about 1000 degr. Fahr. When all the zinc smoke disappears, take sample and test for zinc. Then add enough aluminum to bring your total melt to about 1% zinc.

This is the only information we have on removing zinc from aluminum.

W. J. REARDON.

What is Wrong With the Brass Foundry?

By WILLIAM J. REARDON

President, National Alloys Company, Inc.,
and Associate Editor, METAL INDUSTRY

A Summary—Brief and Directly to the Point. The Brass Foundry Must Stop Working at a Loss

WILLIAM J. REARDON
Associate Editor

THE brass foundry is one of the oldest industries in the country, and until now, was not a bad business, when properly controlled. However, like the railroads, it has suffered greatly from competition. The railroad's competition has been the automobile truck, and the brass foundry's, the die casting and forging plant. Die casting has made work so cheap to meet competition that they have not been able to make money, and numerous failures has been the result. And the record of 1932 will show that brass foundry operations and die casting operations will fail to earn fixed charges.

In short, there is little or nothing in the existing situation to suggest any probability of sustaining markets in the immediate future, regardless of some rallies in business. We must face the fact that many serious problems confront the brass foundry business. Again, logic brings us back to the question of the effect that economic conditions during the coming year will have on our business.

Taking Work Below Cost

Brass foundries and other manufacturers cannot hope to make profits until they cease selling their products at less than cost. For the present demoralized conditions everybody is somewhat to blame, and the remedy is to stop selling except at cost or better.

It seems to be the practice of the brass foundry generally in the last year, to take work at any price to keep going. They figure they have their overhead (such as rent, salaries, taxes, and depreciation) anyway, so the tendency is to bid so much over metal and direct labor, regardless of alloy or kind of casting.

This condition will have to stop in 1933 or there will not be many of us left.

Too Many Small, New Foundries

Another condition has arisen in the brass foundry trade, and that is the starting of so many small foundries that have a few thousand or few hundred dollars. Metal is cheap, equipment plentiful in the second hand men's hands, so a boss molder out of work takes his savings, and very often the savings of his friends, and starts in business. There is no call for more foundries, as the ones in business for years have no work. What chance has the new enterprise, except to go out and tell the trade he has started a foundry and wants to save the buyer money? He claims he has no overhead so can sell cheap.

He not only does harm to himself, for in a few months he loses what money he has, but hurts the old foundry by giving prices far below production cost. This not only hurts the foundry but hurts the buyer in the long run, for the same thing comes back to him in another form. If I sell below cost I get after the people I buy from and try the same tactics, and in the end everyone loses, both seller and buyer.

The Only Remedy

The only remedy is to figure each job and get at least cost out of it. At this time I venture to say that all the brass foundries doing business today would be delighted if they could hold their business at no profit, and just make cost.

Our raw material costs are lower than they have been in all the time of any of us in the foundry today. Depreciation is always with us, whether we admit it or not. When we sell one pound or a ton of castings we give a part of our furnace and our plant with it.

These are days when the buyer has everything coming his way. He need not beware of anything. The sellers are divided against themselves. The sellers are puzzled about what they can get. The buyer knows perfectly what he wants.

Competition has stabilized quality, and inspection has guaranteed it. If things are not as represented the seller must make good. Occasionally, we hear of a foundry sitting back and letting someone else supply the service and not quoting a price when new bids are asked. Some, already doing this, it is observable, are better off than those who are serving the trade. The bad feature of such policy is that they lose the contacts they have made in the past. Price cutting below profit levels is like deflation. It can never be controlled; it gets out of hand.

Research in Bright Annealing Brass and Other Metals

LAST year, the American Gas Association reports, there was a further extension into the brass industry of the principles discovered by the bright annealing research. For annealing large brass coils, the furnaces developed to displace wood-fired muffles have continued to demonstrate their superiority both as to operating cost and labor saving as well as the maintenance of a superior quality of finish. Operating results over long periods of production show gas consumptions ranging from 0.55 to 0.66 cu. ft. of 530 B.t.u. gas per lb. of brass annealed during 24-hour operation. This is considered very satisfactory.

Initial installations have been made of semi-continuous furnaces for annealing nickel silver, an alloy having many of the characteristics of brass. Test runs indicate that nickel silver annealed in furnaces developed largely through this research has practically no nickel oxide. Consequently the expensive bichromate dip is eliminated and, while the finish is not perfect, a quick acid dip removes the slight discoloration.

Mechanically this development has taken the form of semi-continuous furnaces running over 70 ft. in length. Pans resting on alloy rails inside the furnaces carry the metal which is being annealed, and a puller arrangement takes the pans through according to pre-arranged time schedules.

Very definite strides have been made during the current year in adopting to shop practices the experiences gained in the laboratory in bright annealing brass strip and wire. The objective from the beginning, as stated in previous reports of the Research Committee, has been continuous production as opposed to annealing individual coils. The early laboratory research was confined chiefly to metallurgical studies and to efforts to develop and apply synthetic atmospheres that, when used in conjunction with gas heat, would produce desirable commercial finishes on the brass, and at the same time produce internal grain structures that would allow more extensive working of the brass than had heretofore been customary. Metallurgists are agreed that specifications as to grain structure and finish are stricter now than they previously were and that they are quite likely to get still stricter as time goes on.

The continuous annealing furnace, as developed for brass strip and which is now being used in one of the country's largest mills, is over 30 ft. long and takes care of a single strip of brass up to 7 in. in width. It operates at a speed up to 150 ft. a minute during which time a complete cycle of heating, annealing and cooling is carried out. Practical difficulties, such as scratching from the rollers inside the furnace, have been overcome.

Results obtained so far in this furnace indicate that there are possibilities of having certain types of work pass continuously from the roll into the furnace, into the next roll, into the next furnace, etc., from the heavy rough brass down to the final finished material.

Bright annealing of brass wire is now being done on a production basis by the hydrocarbon gas process in gas furnaces of similar design to those developed for strip. While the mechanics of handling the wire at the inlet and outlet ends of the furnace are necessarily quite different, the interpretation of the process is the same. Copper wire is also being bright annealed in the same manner, but it should be borne in mind that bright annealing brass is always a much more difficult matter.

Advanced spooling and coiling methods have been worked out, which in conjunction with the gas bright annealing furnaces give continuous production in every sense of the word.

It is of particular interest to note that orders are being shipped out to customers without any pickling, which is the final test of the anneal and surface characteristics of the finished brass and has been the objective toward which this research has been directed. The plant in which this is being done is now giving serious consideration to the installation of a large 20 strand continuous production unit.

The bright annealing research has been conducted for the Committee on Industrial Gas Research of the American Gas Association, by the development laboratories and engineering staff of the Surface Combustion Corporation.

Life of Tools Machining Free-Cutting Brass

By L. D. SPENCE and J. A. HALL*

The authors present a considerable amount of data on the life of tools under shop conditions machining free-cutting brass in automatic screw machines. The analysis of this data shows that larger feeds and higher cutting speeds than those used in current practice can be combined with a reasonable tool life. The type of relation existing between cutting speed, feed, and life of tool found by Frederick W. Taylor and others for rough-turning of steel does not fit these tests of forming and drilling free-cutting brass. Within the limits of these tests an increase of the cutting speed is accompanied by greater economy. When machining free-cutting brass with ground circular-form tools, the life of the cutting tool between grinds appears to be nearly independent of the feed and of the cutting speed, and to depend primarily on the linear distance the work moves in contact with the tool. This indicates that the wear is primarily a lapping action, which is influenced more by the amount of movement of the edge of the tool against the work than by the pressure between them. Within the limits of the tests the maximum economy in machining free-cutting brass is secured by using the largest feed that the work and tools will stand and by running the stock at the highest spindle speed.

* In charge of tool designing, Brown & Sharpe Manufacturing Company, Providence, R. I., and Professor of Mechanical Engineering, Brown, University, respectively.

Abstract of a paper contributed by the Machine Shop Practice Division for presentation at the Semi-Annual Meeting of The American Society of Mechanical Engineers, Bizwin Inn, Lake of Bays, Ontario, Canada, June 27 to July 1, 1932

Depositing Oxide Film on Aluminum

By A. EYLES
Mechanical Engineer, Manchester, England

THE Electrotechnical Research Institute in Moscow, Russia, is reported to have recently developed a process whereby an oxide film can be deposited on aluminum wire to withstand several hundred volts. This oxide film possesses good insulating, heat-resisting, and heat-conducting properties; it is flexible, mechanically strong, and capable of withstanding shocks and friction. In the event of a local puncture, the heating by an electric spark will produce an intensive oxidation of the bare metal, which will then again be covered with an insulating film.

The extreme thinness of the oxide film, its good heat conductivity, and the large surface in contact with air create exceedingly favorable conditions for cooling, which, taken in conjunction with the very high heat resistance of the oxide film (whose melting point is 2,500 deg. C.) make possible a very considerable increase of the permissible current density. Moisture, chemical reagents and corona do not affect it; it is also very hard.

Method of Deposition

For depositing the film the aluminum is treated with oxidizing chemicals at high temperature. The chemical action of the oxidizing solution can be increased by an electrolytic process, which in its simplest form consists in anodic polarization of aluminum in a suitable electrolytic bath; the oxygen separating during the electrolysis produces the requisite action. An oxide film can be obtained in any weak acid solution and in many weak alkalis. Organic acids produce the best results; good results are obtained also with chromic, oxalic and boracic acids, and with borax and soda. To obtain a sufficiently thick formation the film on the aluminum anode must be disturbed from time to time by imposing an alternating current on the direct current.

A semi-industrial plant has been established at the Moscow Institute for the production of oxide insulated aluminum wire. The first 10,000 metres produced were employed for winding a 20-KW 6,600/550-V transformer to be used for studying the behavior of the insulation under working conditions. The puncture voltage was 300-V and the insulation was not broken when the wire was wound around a cylinder with a diameter thirty times that of the wire.

The Institute has deposited oxide films on ribbons and small plates; with the latter a puncture voltage of 5,000-V has been reached. Experimental work is proceeding for the purpose of improving the quality of the insulation (especially regarding flexibility) so as to enable its use in windings placed in slots. An oxide film has also been deposited on copper conductors, preliminarily covered with a "stocking" of aluminum. (Abstract "Technika," No. 44, 1932.)

Welding Bicycle Frames

Q.—I would like information for the complete manufacture of bicycle frames. What kind of jigs are used for welding the frames? What kind of welding do you recommend for this work?

A.—Both the gas and the electric process are adapted to this work. Possibly the gas method is more in use. The gas weld metal will taper into the base metal gradually and form a smooth filler. If the joints are too rough, try a different sized tip and some other composition of rod. For welding mild steel tubing, bronze welding is very satisfactory as a strength of 60,000 pounds per square inch can be secured. For cleaning the joints, use Bakelite round edge wheels. The flexible shaft machine is very convenient. It would seem that the atomic hydrogen welding process would be ideal for bicycle tubing. This process is clean and quick, and the joints are smooth. The apparatus consists of a holder for two small tungsten electrodes. These are adjusted so that a small electric arc will play constantly and steadily between the points. A small tube attached to the holder delivers a light stream of hydrogen to the arc. The temperature of the arc is high enough to dissociate the molecules of the hydrogen into free atoms, which process absorbs a large amount of energy. The recombining of the dissociated atoms to form hydrogen molecules in contact with the joints to be welded gives back the absorbed energy. As the application of the heat is made to a small space, an intensely hot flame is produced; this fuses and welds the surfaces in the joint. The atmosphere produced over the joint keeps the surfaces clean and protected from the air, so that troublesome oxidation and the use of fluxes are avoided.

There are numerous forms of fixtures suitable for aligning the bicycle parts that are to be assembled by welding. The general requirements of the fixture are correct alignment for lengths and angles, strength and steadiness, quick and solid clamping, and a perfect balance for the convenience of the operator. One style of fixture consists of a foot plate or tripod having a stand with a top plate that can be revolved horizontally. To this plate is attached an arm that can be revolved vertically. By this combination it is possible to locate attached work at any angle. The arrangement is similar in principle to that used in the construction of the frame of the universal radial drill machine. Light angle irons cut and welded at the required angles form good supports for two or more pieces of tubing that are to be welded together. The pieces are laid in the angles with their ends against stops that are clamped or welded in place. Clamps for holding the pieces are best made with screws having lever heads or nuts, so that the piece may be bound or loosened by a quarter turn of the handle. Several of these angle iron frames may be needed. Each one must have a pin or pivot support on the face plate of the stand mentioned above. In some cases these fixtures can be supported in the common bench vise. Also in some cases these fixtures can be supported by two or more small pulley blocks with ropes, so that it is easy for the operator to tilt or revolve the assembly into any desired position.—B. F.

The Aluminum Industry of the World

Where Aluminum is Produced and Manufactured, and in What Quantities

THE last twenty-five years have witnessed the growth of the aluminum industry to undreamed of proportions, not only in the United States but in Europe. The world has been searched for bauxite ores, and reduction plants have been erected wherever these deposits and good markets were found in sufficient volume.

At the present time almost every one of the important European nations has an aluminum industry of its own. The following is a brief description of the most important aluminum producers.

Canada

The only aluminum producer in Canada is **Aluminium, Ltd.**, whose sales in 1931 were about 27,400 tons. Of course, this output was far below capacity, it is estimated something over 50 per cent. The plants are at Shawinigan, Quebec, and Arvida, Quebec.

France

The leading producer in France is **l'Aluminium Francais.** This company controls the **Cie des Produits Chimique et Electrometallurgiques d'Alais, Froges et Camargue,** which produces 92 per cent of the French output. The balance, about 8 per cent, is made by **Sté. d'Electrochimie, d'Electro-Metallurgie et des Acieres, Electriques d'Usine.**

France has in all its plants a total capacity of about 40,000 tons per year.

The locations of the plants are as follows: **Compagnie de Produits Chimiques et Electrométallurgiques Alais, Froges et Camargue:** La Praz, (Savoie); Calypso (Savoie); St. Jean de Maurienne, (Savoie); L'Argentiere-la-Bassée (Hautes-Alpes); Chedde, (Haute-Savoie); Auzat (Ariège); Beyrède, (Hautes-Pyrénés); La Saussaz at St. Michel de Maurienne; Rioupéroux, (Isère); St. Auban, (Basses-Alpes).

Société d'Electrochimie, d'Electrometallurgie et des Acieres Electriques d'Usine; Prémont St. Michel, (St. Michel de Maurienne-Savoie on the Arc); Les Clavaux, (Isère, on the Romanche); Venthon, (Haute-Savoie).

Spain

Spain has one plant owned by **Compagnie A.F.C.** of France and **Aluminium Industrie A.G.** of Switzerland. This company is known as **Aluminio Español, S.A.,** and located at Sabañanigo (Huesca) Spain.

Germany

Germany has five plants with a capacity of about 48,000 tons. The largest producer, **Vereinigte Aluminiumwerke A.G.,** owns the three largest plants. This company is fully owned by the German government.

About 15 per cent of its output goes into kitchen utensils, about 15 per cent into a wide variety of apparatus for different purposes; a large amount of aluminum goes into foil which has become a flourishing department of this industry.

Plants are located as follows: **Vereinigte Aluminium-Werke, A.G.**; Lautawerke, Lausitz, Germany; **Innwerk, Bayerische Aluminium, A.G.,** Innwerk, Töging, Oberbayern, Germany; **Erftwerke, A.G.,** (owned by **Reichswerke,** Berlin): Grevenbroich, Niederrhein, Germany; **Aluminium-Werk, G.m.b.H.,** (owned by Metallgesellschaft, A.G. and I.G. Farbenindustrie, A.G., Frankfort): Bitterfeld, Germany; **Aluminium Industrie A.G.,** (Neuhausen, Switzerland): Rheinfelden, Baden, Germany.

Austria

Austria has two aluminum reduction works, one at Lend-Gastein, which is owned by **Aluminium Industrie, A.G.,** of Switzerland, and the second at Gmunden, Oberösterreich, which is known as **Aluminiumwerke Steeg.** This plant is controlled by **Elektrizitatswerke Stern und Hafferl, A.G.**

About 45 per cent of the output of German plants goes to rolling mills for fabricated products. The German industry supplies all domestic requirements and exports raw metal, semi-manufactured and finished products.

Great Britain

The **British Aluminium Company** is the big producer with a capacity of about 13,000 long tons per year. In addition Great Britain imports about 18,500 long tons and exports about 4,000 long tons.

Locations of aluminum reduction works are as follows: **British Aluminium Company, Ltd.:** Kinlochleven, Argyllshire, Scotland, and Foyers, Inverness-shire, Scotland; **North British Aluminium Company, Ltd.:** Fort William, Inverness-shire, Scotland; **Aluminium Corporation, Ltd.:** Dolgarrog Sidings, near Llanwrst, North Wales.

Italy

Italy's industry had a record year with a production of over 11,000 tons. There are now four plants, the oldest being **Societa Italiana dell'Allumino;** the next, a French subsidiary of **l'Aluminium Francaise;** the next a Swiss subsidiary of **l'Industrie de l'Aluminium,** at Porto Marghera with a capital of 20,000,000 lira ($1,025,000) and an annual output of 6,000 tons; and the latest, a German subsidiary at Montecatini, of **Vereinigte Aluminium-Werke, A.G.**

Locations of reduction works are as follows: **Societa dell'Alluminio Italiano** (owned by **Aluminium Limited):** Borgofranco d'Ivrea, on the Dora Baltea, Italy; **Societa Anonima Veneta dell'Alluminio (S.A.V.A.),** Bussi (Aquila), on the Pescara, Italy, and Porto Marghera, near Venice, Italy; **Societa Italiana dell'Alluminio** (Milan), (owned by Montecatini), Mori, Italy.

Japan

Japan has three plants manufacturing commercial articles, the works being at **Fukuda, Tokai Emken** and **Sumitomo.** The raw aluminum is imported. In 1931,

aluminum ingot imports totalled almost 2,800 tons, scrap metal imports were about 2,400 tons, making a total of over 5,200 tons.

Norway

The largest producer in Norway is the **Norsk Aluminium Company,** with an output in 1931 of 21,400 tons. This compares with a production of over 29,000 tons in 1929.

Locations of reduction works are as follows: **Aktieselskapet Stangfjordens Elektrokemiske Fabriker,** (owned by **British Aluminium Company**): Stangfjord; **Aktieselskapet Vigelands Brug** (owned by **British Aluminium Company**): Vigelands; **Det Norske Nitridaktieselskab** (owned by **Compagnie A.F.C., British Aluminium Company** and **Aluminium Limited**): Eydehavn and Tyssedal; **Norsk Aluminium Company** (jointly owned by **Norwegian** interests and **Aluminium Limited**): Hoyanger; **A/S Haugvik Smelteverk,** Glomfjord.

Switzerland

Switzerland had an output of about 16,000 tons in 1931 as compared with 20,700 tons in 1929. The large producer in Switzerland is **l'Aluminium Industrie, A.-G.** or the **Societe Anonyme Pour l'Industrie de l'Aluminium** of Neuhausen, a company of 66,000,000 Swiss francs capital, (about $12,700,000). It manufactures raw aluminum, special alloys and manufactured products, having a total annual capacity of 28,500 tons. It has four plants, located in **Neuhausen** (Switzerland), **Chippis** (Switzerland), **Rheinfelden,** (Germany) and **Lend,** (Austria).

This company also has a subsidiary, the **S.A.V A.; (Societa Alluminio Veneto Anonima)** at Porto Marghera, Italy, with a capitalization of 20,000,000 lira ($1,025,000) and a capacity of 6,000 tons.

The other producer is **Fabrique d'Aluminium Martigny, S.A.,** with a plant at Martigny-Bourg, Canton Valais.

Russia

Russia had no aluminum production in 1931, but plants were under construction with the aid of the French producers. The **Volkhov** plant will have a capacity of about 6,000 tons, and with that of **Dnieper** plant will total about 20,000 tons per year. It is the aim of the Russian government to build the aluminum industry up to a total of over 200,000 tons per year by 1937. It has been stated, however, that there is a lack of adequate supplies of bauxite, necessitating the substitution of less workable ores.

China

The **Aluminium-Walzwerke für China, A.G.** has been formed at Bâle with a capital of 500,000 Swiss francs ($96,250), for the production of aluminum sheets, foil, etc., in China. The founders of this company include **Aluminium Ltd.** (Canada), **British Aluminium Company, Ltd.** (Great Britain) and **l'Aluminium Industrie** (Switzerland). In 1931, China took about 1,450 metric tons of foil from Germany.

Alliance Aluminium Compagnie

The most important development in the aluminum industries of Europe during the past year was the formation of the **Alliance Aluminium Compagnie,** for the purpose of expanding the sale of aluminum and developing its uses. This is a co-operative organization which replaces the old **Aluminum Cartel.** Headquarters are in Bâle, Switzerland.

The company is capitalized at 35,000,000 Swiss francs ($6,737,500) divided into 1,400 A shares of 25,000 francs ($4,812.50) each. The Board of Directors is composed of the following:

Louis Marlio, French industrialist, Paris, France.
Dr. Rudolf G. Bindschedler, banker, Zurich, Switzerland.
Arnold Bloch, Swiss industrialist, Neuhausen, Switzerland.
Robert W. Cooper, British industrialist, Tackley Park, England.
André Henry Coüannier, French industrialist, Paris, France.
Dr. Maurice Lugeon, professor at the University of Chevilly, Lausanne, Switzerland.
Dr. Ing. Max von der Porten, German industrialist, Berlin, Germany.
Dr. Max Stähelin, banker, Bâle, Switzerland.
Gerhard Steck, Swiss industrialist, Schaffhouse, Switzerland.

United States

The sole producer of aluminum in the United States is the Aluminum Company of America. The total output of raw metal in 1931 was 80,700 tons against 104,100 tons in 1930. Reduction works are located at Niagara Falls, N. Y.; Massena, N. Y.; Alcoa, Tenn., and Badin, N. C.

The Aluminum Company of America formerly operated Aluminium, Ltd., of Canada as a subsidiary, but later separated, these two organizations now operating entirely independently.

The officers of the A. C. A. are **Arthur V. Davis,** Chairman of the Board of Directors; **Roy A. Hunt** (son of Captain Alfred E. Hunt, founder of the company), President; **E. S. Fickes,** Senior Vice-President; **E. R. Gibbons,** Senior Vice-President and Secretary; **R. E. Withers,** Senior Vice-President and Treasurer; **S. K. Colby, C. B. Fox, W. C. Neilson, G. J. Stanley, P. J. Urquhard** and **I. W. Wilson,** Vice-Presidents; **J. R. D. Huston** and **C. L. Lycette,** Assistant Secretaries; **J. J. Demskie,** Assistant Treasurer.

Manufacturing subsidiaries are: **United States Aluminum Company,** (New Kensington, Pa., Cleveland O., Massena, N. Y., Buffalo, N. Y., Edgewater, N. J., Garwood, N. J., Alcoa, Tenn., Fairfield, Conn.); **Aluminum Screw Products Company,** Edgewater, N. J.; **Aluminum Seal Company,** New Kensington, Pa.; **Aluminum Cooking Utensil Company,** New Kensington, Pa.

Statistics of World Production

According to the Mineral Industry for 1931, (Section on Aluminum written by C. L. Mantell), the statistics of the world production of aluminum in tons of 2,000 pounds are as follows:

	Austria	Canada	France	Germany	Great Britain	Italy	Norway	Switzerland	U. S.	Total
1929	2,700	36,000	29,000	31,500	10,000	7,373	29,142	20,700	102,270	270,000
1930	3,500	34,900	24,600	30,200	16,000	7,968	27,357	20,500	104,100	269,000
1931	3,000	30,000	18,000	25,000	13,100	11,109	21,400	16,000	80,700	218,000

A Century of Progress in Science and Engineering

"World's Fair" at Chicago This Year Will Stress Our Technical Advances During the Past 100 Years. Every Major Industry and Many Societies and Associations Will Take Part in the Tremendous Project Opening June 1

THE latter half of 1933 will witness an immense migration toward Chicago, where the international Century of Progress Exposition will be held. This "World's Fair" will differ from those of the past in that science and industry will be the dominant factors, the object of all components being to demonstrate the world's progress in all scientific and technical lines during the past 100 years.

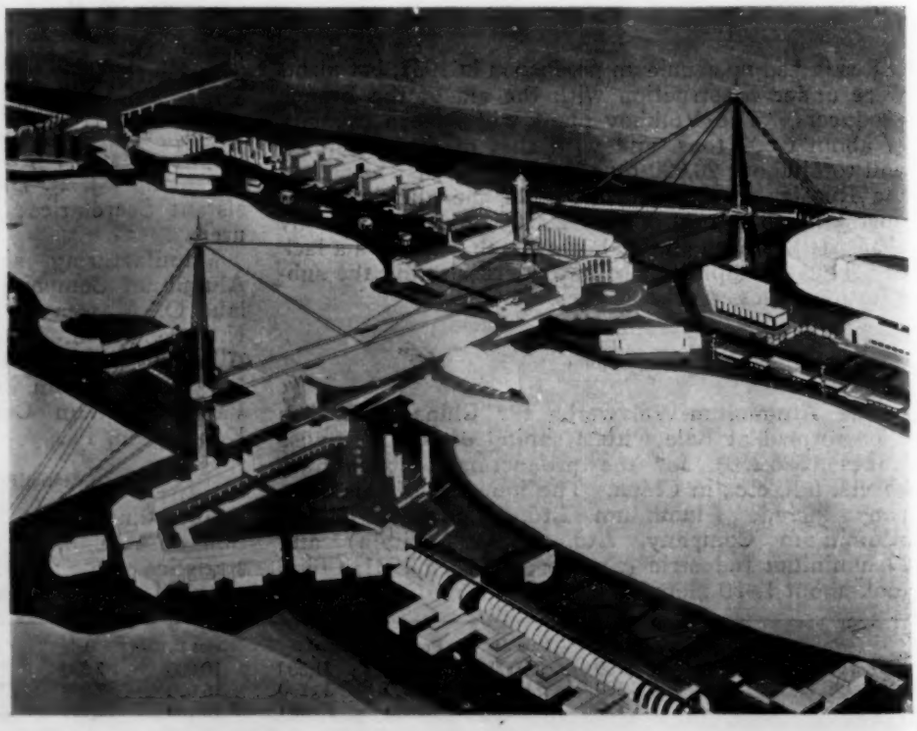
Exhibitors representing over 300 companies in all the leading industries had contracted to spend more than $4,600,000 for exhibit space, or for the erection of special buildings of their own, up to December 1, 1932.

Among the industries represented are the electrical, Restaurant; Twelfth Street Entrance; Sixteenth Street communications, radio, railroad, automobile manufacturing, petroleum, office equipment and appliances, industrial engineering, chemical, medical supplies, steel, automobile tire, agricultural implement, air conditioning, building materials, heating, scientific equipment, refrigerator, household equipment and appliances, food production, beverages, printing and graphic arts, foundry, housing, etc.

Metal men will find special interest in an exhibit which will show the remarkable development of the copper and brass industry in the last 100 years. The exhibit will be fostered by the Copper and Brass Research Association, and will be one of the features in the Mineral Industries Building. Copper, brass and bronze will be shown in every conceivable form. A wide range of alloys, the purpose of which is to meet special requirements in the field of industry, will be on exhibition. Innumerable special finishes used on copper and brass, such as chromium and nickel plating, will appear in the display.

Meetings and Conventions Planned

Many national associations and societies have wisely chosen Chicago for their conventions and major meetings in 1933, dating them so that their members will be able to visit the Century of Progress Exposition without an additional trip. The week of June 26 has been designated as "Engineering Week" by those in charge of the Exposition, and a large group of scientific and technical organizations will participate in the activities of the week. These include the American Foundrymen's Association, American Association of Engineers, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, Society for Promotion of Engineering Education, and many others. The American Electro-



Architect's Drawing of the Century of Progress Exposition. The Area in the Foreground is Northerly Island, a Lagoon on Which a Large Part of the Fair Is Being Built. The Mainland Section Is in the Background. The Towers of the Unique "Sky Ride" Are Shown Supporting the Cables Which Will Whisk People in Glass and Aluminum "Rocket" Cars from the Island to the Mainland.

platers' Society will hold its 1933 convention from June 27 to 30, inclusive, and will take part in a tremendous program planned for "Engineers' Day," June 28. The Electrochemical Society will hold its Fall Meeting at Chicago in September, affording its members an opportunity to visit the exposition at that time.

Necrology

Calvin Coolidge

THE death on January 5, 1933, of Calvin Coolidge, thirtieth president of the United States, left the country mourning the loss of one of its great leaders.

His rise from a simple life in New England to the highest office in the land has been recounted many times. It is to be remarked that his career, devoted almost entirely to public service, was a symbol of common sense, prudent action, and lack of pretension. These are the virtues he embodied, and these are the precepts which he desired to impress by word and example upon the minds of his fellow men.

Calvin Coolidge will long be remembered for the continued prosperity of this country throughout his administration.

AMONG the men of prominence in the metal industries who passed away during 1932, were the following:

John B. Swift, former president, Eagle-Picher Lead Company, Cincinnati, Ohio.

George Edward Abbott, president, Abbott Ball Company, Hartford, Conn.

Frederick DeMund Mackay, vice-president, E. W. Bliss Company, Brooklyn, N. Y.

C. W. Curtiss, president, Waterbury Clock Company, Waterbury, Conn.

John W. Slattery, 50-year veteran of the electroplating industry, Waterbury, Conn.

Nathan M. Carl, vice-president, Buckeye Brass Company, Cleveland, Ohio.

Richard H. Sliter, veteran of the electroplating and finishing industries, Newark, N. J.

James W. Brown, expert on low voltage generators for electroplating equipment, St. Louis, Mo.

H. R. Corse, sales manager, Lumen Bearing Company, Buffalo, N. Y.

Charles J. Bogue, Charles J. Bogue Electric Company, Hoboken, N. J.

LaVerne W. Spring, chief chemist and metallurgist, Crane Company, Chicago, Ill.

Walter P. Bryan, director, American Hardware Corporation and Plume and Atwood Manufacturing Company.

William Spencer Ward, president, Boissier Electric Corporation, New York.

Jesse J. Armstrong, vice-president, Rome Brass and Copper Company, Rome, N. Y., which later merged with Revere Copper and Brass, Inc.

Edward H. Crosby, vice-president, Veeder-Root, Inc., Hartford, Conn.

Theodore Koven, president, L. O. Koven and Brother, Jersey City, N. J.

Christian J. Hills, president, Haydenville Company, Haydenville, Mass.

Seth E. Thomas, president, Seth Thomas Clock Company, Thomaston, Conn.

William E. Poole, former general superintendent, New York Insulated Wire Company, Wallingford, Conn.

Dr. George K. Burgess, director, Bureau of Standards, Washington, D. C.

Joseph L. Sweet, a leading jewelry manufacturer of Attleboro, Mass.

John S. McCormick, president, J. S. McCormick Company, foundry supplies, Pittsburgh, Pa.

Paul Retzlaff, veteran foundry superintendent, Milwaukee Valve Company, Milwaukee, Wis.

Edward R. Hoyt, founder, Hoyt Metal Company, St. Louis, Mo.

W. J. Cook, for 50 years executive head of the galvanizing departments, Wheeling Steel Company, Wheeling, W. Va.

James Hughes, pioneer Wisconsin foundryman, Milwaukee, Wis.

Stewart H. Jones, founder Canadian Bronze Company, Ltd., Montreal, Canada.

T. F. Jennings, for 20 years foundry superintendent for the Utah Copper Company, Garfield, Utah.

Frank J. Gorse, assistant treasurer, Scovill Manufacturing Company, Waterbury, Conn.

Abraham P. Cobb, vice-president, New Jersey Zinc Company, New York.

Edward Kneeland, treasurer, United Engineering and Foundry Company, Pittsburgh, Pa.

John Stewart Murray, director of purchases, Aluminum Company of America, Pittsburgh, Pa.

Samuel E. Huenerfauth, president, Crown Rheostat and Supply Company, Chicago, Ill.

Frank L. Squires, treasurer, Waterbury Farrel Foundry and Machine Company, Waterbury, Conn.

John Henry Schumann, chairman of the Board of Directors, Hilo Varnish Company, Brooklyn, N. Y.

David Long Summey, expert on extrusion equipment for the Scovill Manufacturing Company and the Chase Companies; consulting engineer U. S. Metals Refining Company, New York.

S. D. Benoliel, president, International Chemical Company, Philadelphia, Pa.

Henry Weyand, president, Lux Clock Company, Waterbury, Conn.

Lewis H. Jones, formerly president, Detroit Copper and Brass Rolling Mills, Detroit, Mich.

Stephen S. Tuthill, formerly executive secretary, American Zinc Institute, Brooklyn, N. Y.

Andrew Thompson, vice-president, Titanium Alloy Manufacturing Company, Niagara Falls, N. Y.

Andrew Chisholm Dallas, until 1917, chairman of the Dallas Brass and Copper Company, Chicago, Ill.

Col. Robert Streeter, consulting engineer and formerly chief metallurgical engineer, U. S. Aluminum Company, New Kensington, Pa.

EDITORIALS

Review of 1932—Prospects for 1933

THE non-ferrous metal industries in 1932 continued to suffer, for the third year in succession, together with almost all other activities in the United States. For a good part of the year operations ran from 20 to 50 per cent capacity. The line of productive activity declined steadily until it reached its low point during the Summer, June and July. In the early Fall, however, a revival was evident which continued through October and part of November. Since then seasonal reaction has taken effect.

No accurate index numbers are available for the non-ferrous industries alone. It can be safely stated, however, that they follow general business with little variation, as they are almost all secondary in character and cater to other manufacturing lines. Consequently the trends of industry as a whole apply fairly well to the non-ferrous field.

According to Secretary of Commerce Chapin, during 1932 industrial production was 21 per cent lower than in 1931; factory employment declined about 17 per cent and payrolls about 37 per cent. The expenditures for construction were about $4,400,000,000 as against $7,600,000,000 in 1931. The dollar figures in this instance, however, must not be taken too literally (and the same applies to other lines), as raw material prices and labor rates fell rapidly during the first half of the year; consequently, the physical volume of construction declined much less than the dollar figures.

Exports declined slightly less than 20 per cent in volume and imports about 16 per cent. Declines in these values were 33 per cent and 37 per cent respectively.

So much for the clouds which hung over us. We must not, however, overlook the very important and not inconsiderable silver linings, which were unmistakably in evidence. It was no small improvement in actual operations and in business sentiment, which began in August and carried through into November. True, at this time business is low, but this is due as much to seasonal influence as to any other cause. At present our industries are somewhat hesitant, due partly to the change in our national administration, but on the whole, not pessimistic.

In one of the worst years in industrial and financial history, we have maintained our currency at its full gold value. A considerable amount of very constructive legislation was enacted at the instance of President Hoover and his supporters, which it seems, has been instrumental in stemming the tide of deflation. The Reconstruction Finance Corporation Act has made it possible to extend Government credit to banks, insurance companies, railroads, building and loan associations and farm mortgage associations. The Emergency Relief and Construction act broadened the powers of the Reconstruction Finance Corporation and provided funds for loans to the States for human needs among the unemployed (who now number about 11,000,000). Funds are also available to self-supporting public and private construction enterprises. In addition the Federal Home Loan Banks have been set up for the purpose of assisting home owners by making mortgages liquid and also stimulating construction.

There is much complaint about the early lack of effectiveness in the operation of some of these projects, but it is not abnormal for difficulties to arise in setting up such huge organizations so rapidly. Undoubtedly the wrinkles will be ironed out.

In the field of foreign trade it must not be overlooked that the United States still retains its position as the world's leading export nation.

The unemployment situation has been cruel, but it has been somewhat mitigated by the Share-the-Work-Movement, inaugurated last August by the President's conference with business and industrial leaders.

No review of industry is complete without dwelling on the important fact that disputes between labor and capital have been less frequent than at the peak of the boom of 1929 or the depression of 1920-1921. In the words of Secretary of Commerce Chapin, "The warmest commendation must be accorded to American labor for its admirable conduct during the past year, as evidenced by its sensible restraint."

The year 1932 was one of the worst in American industrial history. But December, 1932, is better than July, 1932. Therein lies our hope for the coming year.

METAL PRICES

The prices of metals during the year were not exempt from the general situation. They were consistently low, although in some cases they ended the year a little higher than they began. Tin closed at 22.75 cents a pound, a little above the year's average. Copper ended at the lowest figure in history, 4.875, against the lowest yearly average ever made, 5.667. Lead also wound up below its very low average, but its situation is not altogether discouraging as the market is not out of hand. Zinc seems to be setting its house in order, reducing its stocks of metal. It closed at 3.495, above the year's average. Antimony started at 6.15, fluctuated between 5 and 7 and ended at 5.45. Aluminum was firmly controlled at 23.30. Nickel was similarly held at 35 for electrolytic. Platinum was steady until May at $37.50 an ounce, but suffered sinking spells from then on, dropping to 28. Silver ended the year at 24.375c an ounce, almost its lowest point.

The reason for these dismal records calls for no extended discussion or involved explanations. We still have enormous stocks of metals and we are still producing them too fast for our curtailed markets to use up these stocks. Until this situation is changed there can be no improvement in prices.

TECHNICAL PROGRESS

For a year of business stagnation the improvement in technical processes and the development of new products was more than commendable. In the copper base alloys a new copper-beryllium mixture, containing 2.25 per cent beryllium, has been placed on the market. A new high-conductivity copper has been produced, of almost chemical purity. Very thin and very wide copper sheets are now being produced by electrolytic methods.

In fabricating methods and equipment, a new electric, continuous-type furnace for bright annealing miscellaneous non-ferrous parts, was developed. Gas-fired annealing for brass coil has been successfully put into commercial operation. Strip annealing under "controlled atmospheres," keeping the metal from exposure to air by means of water or gas seals, is attracting more and more attention. Nickel silver is now being hot rolled successfully. Strip brass is now made by "flowing" the molten metal through rolls.

Zinc has stood out largely for the progress made by die casting in new fields, because of the improved alloys developed through the use of high purity zinc.

Magnesium continues steadily to show wider possibilities. Its close relative, aluminum, has not relaxed in its steady development, continuing its spread in building, transportation and construction. Aluminum foil is being used for insulation.

Nickel has also gone ahead, but more along the lines of small quantity additions to other metals, although Monel metal has been gaining popularity in such industries as chemicals, dairies and laundries. It is being viewed with some favor in the brewing industry.

Lead has found growing appreciation among architects for building trim (antimonial lead alloy), and as a coating for copper. It acquires an attractive patina with age. It is useful as a lubricant in cold drawing steel rod and tubes and as an engine packing, using a lead tube around a core of flax and graphite. It may also be found effective for sound insulation and for lead weighting fabrics, using lead phosphate as the medium.

The brass foundry is witnessing the steady and continued growth of casting more and more types of alloys in permanent molds. Copper-base alloys are now being successfully made in this fashion. Does it not behoove brass foundries to study these new methods with an idea to installing the necessary equipment in their own shops? At this time, the trend of large scale production seems to be away from sand.

There is growing interest in the silicon and nickel-silicon bronzes and in heat-treatable casting mixtures.

In the field of secondary metals work has been done on the production of soft lead from scrap antimonial lead. Rust-resisting paints are being made, using the secondary 83 lead, 13 antimony, 2 tin alloy as a base. A zinc oxide is being made for paint pigment, from zinc base die casting scrap.

The Aluminum Research Institute has published its methods of analysis for secondary aluminum, and tentative methods of sampling.

The low price of silver has turned some attention to it for corrosion resistant linings in chemical plants.

Undoubtedly the most striking development in metals during the past year was the rapid growth of the use of powdered metals made into any desired form under tremendous hydraulic pressures. The "self-lubricating" bearing seems to be an accomplished fact, where the service is not too severe, according to reports on the numerous parts made from pressed powdered metals in use in Chrysler automobiles.

In electroplating, the anodic oxidation and subsequent coloring of aluminum has continued to hold wide attention. Rhodium plating is growing in strength in the jewelry industry. An interesting new patina for copper has been developed to duplicate rapidly, the effect of long aging in atmospheres. Tungsten plating for protection against chlorine seems to have been accomplished. New types of rubber linings for plating tanks have effected much improvement. There are rumors of barrel plating chromium as a practical commercial operation.

Tin plating has assumed greater importance due to its adoption by some automobile makers for cast iron pistons. Word has come of ultra rapid nickel plating methods developed in France. A new zinc anode has been developed, containing 0.5 per cent aluminum and 0.3 per cent mercury. Also much has been said of a new process for heavy electro-zincing at high current densities, with the zinc fed to the solution from concentrates, rather than anodes.

One of the most interesting developments in the past year has been the degreasing of metals and metal parts, preparatory to plating, by means of organic vapors. This process, which takes a large load off the commercial cleaner without replacing it, bids fair to become an important operation in the plating plant.

No summary of the plating industry can possibly omit the vitally important research work now being carried on co-operatively by the American Electroplaters' Society, the American Society for Testing Materials and the Bureau of Standards, in testing 7,000 plated samples against outdoor exposure for resistance to corrosion. This work must and will go on regardless of the difficulty of supplying the funds.

BUSINESS DEVELOPMENTS

In times like these, the economic phases of industrial activity are uppermost in the minds of everyone. It is inevitably a time of readjustment, consolidation of defenses, and to those who are fortunate enough to find themselves in such a position, for marshalling forces for the next attack. What is happening in the various branches of the non-ferrous metal field?

Copper as a raw material is all at sea for the moment, but the copper base alloy fabricators are walking in their own paths, making their own plans, as they have problems peculiar to themselves. When, as and if copper recovers, they will not mind paying fair prices. They ask only stability. In the tin manufacturing industry we have seen a rise in the use of pewter and Britannia metal, due to a new vogue. It seems that fashion exercises its influence even in the worse times. Nickel is now a basic industry, following the rises and falls of general business, as it has spread into dozens of fields and markets. Lead still rests mainly upon the paint industry, lead-covered cable and batteries for its distribution, and although some interesting new outlets have been discovered, they are not yet large tonnage consumers.

In the brass foundry the age old problem still exists, intensified by hard times—the havoc created by ignorance of costs and over-anxiety to get volume of business, resulting in taking work at a loss. The situation today is such that only those who, through ignorance or mistaken policies, are willing to take work below cost, can get contracts of any size.

In the jewelry industry there is one important side line which is making good progress, of course altogether due to the falling commodity market, that is the business of collecting and remelting old gold for sale to the Assay Office. Total silver consumption fell 28% below 1931, largely in Sterling hollow-ware and plated ware. Sterling flatware consumption remained constant.

An important event in the secondary metal industry was the purchase of the Federated Metals Corporation, the largest American secondary metal producer, by the American Smelting and Refining Company, one of the oldest producers and refiners of primary metals. There seems to be no diminution of the trend of metal manufacturers and reclaimers to go into the hands of primary metal producers. Other mergers took place, although some of them could hardly be dignified by that name, as the situation was so desperate that it was a case of either sell out or die. The Doehler Die Casting Company took over the plant and business of the Newton Die Casting Company, moving the operations of the latter from New Haven, Conn., to Pottstown, Pa. The American Manganese Bronze Company of Philadelphia, Pa., acquired Paul S. Reeves and Company, and the Caskey Brass and Bronze Company, both of Philadelphia. The Western Cartridge Company acquired the Winchester Arms Company of New Haven. The Torrington Manufacturing Company, Torrington, Conn., is now manufacturing the entire line of testing instruments made by Riehle Brothers Testing Machine Company of Philadelphia, Pa.

The Waterbury Clock Company, Waterbury, Conn., went into receivership in September, but was refinanced and reorganized by J. R. Sheldon who became president, and with his associates took control of the company.

The outstanding business event in the electroplating industry was the opinion rendered by the U. S. Circuit Court of Appeals sustaining the decision of the U. S. District Court which had upheld the Fink chromium plating patent, owned by United Chromium, Inc.

THE OUTLOOK FOR 1933

The most clearly visible effect of the pressure of the past three years, each one worse than the preceding, has been to eliminate every possible penny of unnecessary expense in industrial operations. Frills are gone, and many minor necessities as well. Well financed and strong companies have made it their business to put in the last word in labor saving equipment as they have gone along. Those companies in a less fortunate position would be glad to do likewise but are restrained by lack of funds. If suitable credit arrangements could be made, many of them would undoubtedly go ahead. The non-ferrous metal manufacturing and finishing industries are fully convinced of the need for producing at the lowest possible cost.

There is no need to point out the roughness of the road ahead. Our vision has been made too sharp and our senses too keen, by deprivation. But through the darkness we can see—if we are not blinded by pessimism—some light which is far from weak. The National Committee on Industrial Rehabilitation, which we have discussed several times in the past few months in these columns, reports that programs are under way involving a total expenditure of over $105,000,000 by industrial plants and retail establishments, for the purchase of "capital goods"—machinery and equipment—to produce at lower costs. The importance of this movement is great. Here and there we find industries which are even doing fairly well. According to the American Oil Burner Association the oil heating industry in general has held up during the past year. This industry is no small consumer of brass castings. The Rhode Island jewelry industry has begun to see improvement. Electroplating shops experienced a very encouraging revival in the Fall, which, although it has receded, leaves them still markedly above the low point of the year. They feel that 1933 is sure to be no worse than 1932, and is very likely to be better. Such an attitude is encouraging because it is the opinion of a hard-headed trade. It is based only upon realities. The same situation is true in the jobbing brass foundry industry.

Plans are afoot on a huge scale to expedite low cost housing and slum clearance with the aid of the Reconstruction Finance Corporation. Concrete evidence of progress in this field has been slow because of delays occasioned by the need for State legislation in many cases, to take advantage of the Corporation's aid. However, tremendous pressure is being brought to bear which will undoubtedly take effect. When it does, the consequent improvement in the building industry will be felt throughout all of the metal trades. Add to this the effect of improved operation of the Home Loan Bank system, established at the instance of President Hoover, and we have possibilities which are very highly rated by such authorities as R. J. Hamilton, president of the American Radiator Company who states, "The prospects for the next year are definitely better than the status of 1932." The outlook for 1933 seems to be far from discouraging, also, to Gerard Swope, president of the General Electric Company and A. W. Robertson, chairman of the Westinghouse Electric and Manufacturing Company.

It has been stated also that at no time in our history have the major corporations of the country (excepting railroads) stood, in a depression, in such strong financial condition. It has been estimated that corporation surpluses total $4,000,000,000. The money is there but these corporations are not spending for maintenance and modernization as they are capable of doing. If this is accurate, then more power to the Industrial Rehabilitation Committee! Beginning from this point, increasing employment in the capital goods industries could start a snowball rolling which might grow to immense proportions.

One of the most important elements in our fight to emerge from our distress is the concerted and practically unanimous effort to reduce wasteful spending by Governments—national, state, county and city. We are witnessing week by week, reductions in budgets everywhere. In many cases these reductions are insufficient; in some instances Government revenues are falling faster than costs. Difficult as this problem is, it is our belief that we are working towards its solution. The important thing is the correct frame of mind. In this, we are convinced that public opinion has reached our legislators in no uncertain terms—the demand to plan the minimum possible expenditures, without injuring the machinery of administration and without neglecting the destitute.

Our problems are not only national. Even the man on the street now realizes that we have been caught in a whirlpool which is world-wide. The United States is sending representatives to the coming World Economic Conference, who in preliminary conferences, have analyzed the problems and classified them as far as possible, in four major groups.

1. Reversal of the downward trend of commodity prices.
2. Stabilization of currencies.
3. The final settlement of international debts, private as well as governmental.
4. Leveling and removal, as far as possible, the barriers to trade between nations.

This is a large order and we shall be unable to find great fault if the Conference does not succeed in settling satisfactorily, all of these momentous questions. But progress will be made.

And that, in a word, summarizes our prospects for 1933. The METAL INDUSTRY, ending its 30th year, looks ahead to its 31st, confident that progress will be made.

Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

ASSOCIATE EDITORS

Metallurgical, Foundry, Rolling Mill, Mechanical

H. M. ST. JOHN — W. J. PETTIS
W. J. REARDON — P. W. BLAIR

Electroplating, Polishing, and Metal Finishing

O. J. SIZELOVE — A. K. GRAHAM, Ph.D.
G. B. HOGABOOM — WALTER FRAINE

Black on Zinc

Q.—I enclose a zinc fuse cap. Please suggest a dip to produce a good black finish on this.

A.—We would suggest that you use the following formula for a black color on zinc:

Nickel chloride	4 oz.
Ammonium chloride	6 oz.
Ammonium sulphocyanide	2 oz.
Zinc chloride	½ oz.
Water	1 gallon

Temperature of dip, 100° to 110° F.

This dip will produce a good black color.

O. J. S., Problem 5,159.

Chloride Gold Solution

Q.—Please give formula for a gold chloride plating solution. I want to put a heavy coating on brass and bronze, to withstand friction.

A.—Formula for chloride gold solution:

Gold chloride	2 oz.
Hydrochloric acid	8 to 16 oz.
Water	1 gallon

Temperature, 80° F.; use ½ to 1 volt; gold anodes.

The concentration of the hydrochloric acid does not seem to make a great deal of difference. The greater the concentration the faster the reduction of the anode.

It will be necesary to plate the brass or bronze in a cyanide gold solution before plating in the acid solution.

Heavy deposits of gold can be obtained in the acid solution, but the deposit is no harder than one that is obtained from a cyanide solution.

O. J. S., Problem 5,160.

Barium Sulphide Finish

Q.—We are enclosing sample of what is called acid bronze, or perhaps fire bronze. Has your chemical adviser any knowledge as to how to secure these finishes?

We are interested first of all, of course, in determining plating process, but if the process is not one of plating, then whatever it is we would appreciate any information you may give us as to how it may be obtained.

A.—We do not know why this has been termed acid or fire bronze finish, as the finish is obtained by using a bronzing solution made of yellow barium sulphide ½ oz., water 1 gallon. The solution is used at a temperature of 100° F., and the work is immersed until a color is produced that is slightly darker than the finish desired.

USE THIS BLANK FOR SOLUTION ANALYSIS INFORMATION

Fill in all blanks if possible.

Date .....

Name and address: .....**Employed by:** .....

Kind of solution: .....**Volume used:** .....

Tank length: .....**width:** .....**Solution depth:** .....

Anode surface, sq. ft.: ..... **Cathode surface, sq. ft.:** .....

Distance between anode and cathode: .....**Kind of anodes:** .....

Class of work being plated: .....**Original formula of solution:** .....

REMARKS: Describe trouble completely. Give cleaning methods employed. Send small sample of work showing defect if possible. Use separate sheet if necessary. _____

NOTE: Before taking sample of solution, bring it to proper operating level with water; stir thoroughly; take sample in 2 or 3 oz. clean bottle; label bottle with name of solution and name of sender. PACK IT PROPERLY and mail to METAL INDUSTRY, 116 John Street, New York City.

They are then scratchbrushed dry using a fine crimped brass wire wheel revolving at 800 R.P.M. Lacquer with a good gloss lacquer to protect the finish. The work must be made of copper or be copper plated to produce the finish.

O. J. S., Problem 5,161.

Copper Analysis

Q.—Sending cyanide copper solution for analysis. Please give recommendations for correcting.—Craftsman.

A.—Analysis of cyanide copper solution: Metallic copper, 4.74 oz., free cyanide, 1.43 oz.

Analysis shows the solution to be too dense for the usual condition of a cyanide copper solution. We would suggest that one-half of the volume of solution be taken from the tank, and then fill tank to proper solution level with water. If the deposit is still streaky, add 1 oz. of hyposulphite of soda to each 100 gallons of solution. Operate solution at a temperature of 120° F.

O. J. S., Problem 5,162.

Dip Copper Finish

Q.—We enclose samples of finish we want to get on some rings, sample of finish which we can get with a copper dip not burnished, and same finish with copper dip burnished.

Can you advise what we should do to get the darker finish which we desire by using a copper dip, as we do not want to plate on this job?

A.—You can obtain the finish desired upon your dip copper by using a sulphur solution made of liquid sulphur 1 oz., water 15 to 20 gallons. Use the dip cold; immerse the work after the copper dip operation in the sulphur solution just long enough to produce a slight discoloration. This will probably take 5 to 10 seconds.

The work is then steel ball burnished for 3 to 5 minutes, or tumbled in dry hardwood sawdust for 10 to 15 minutes. Sawdust which has been used for some time for drying purposes will work better than new sawdust, providing it is not too dirty.

With a little experimenting along the lines suggested, you should have no trouble in duplicating the finish as samples submitted.

O. J. S., Problem 5,163.

Nickel Analysis

Q.—Please analyze the sample of solution I am sending you under separate cover.

Our trouble seems to be brittleness of nickel which causes it to break when being color buffed.—W. C.

A.—Analysis of nickel solution:

Metallic nickel	2.23 oz.
Chlorides	5.46 oz.
pH	6.8

The pH is entirely too high and this is the cause of the deposit raising when color buffed.

To correct the pH it will be necessary to add to the 233 gallons of solution 34 fluid ounces of c.p. sulfuric acid. After adding the acid, stir solution thoroughly before using.

O. J. S., Problem 5,164.

Nickel Analyses

Q.—I am sending three nickel solutions for analysis and recommendations. Please test the No. 2 and 3 samples for lead. The three solutions are 1,000 gallons each.—J. V.

A.—Your three solutions analyzed as follows:

Solution No. 1: metallic nickel 3.05 oz. per gallon, chlorides, 8.5 oz. per gallon, pH 5.2.

No. 2: metallic nickel, 8.74 oz., chlorides, 1.28 oz., pH 2.

No. 3: metallic nickel, 7.06 oz., chlorides, 1.35 oz., pH 2.

The chloride content of the solutions is too low. Increase the chloride content of No. 1 solution to 3 ozs. per gallon, and No. 2 and No. 3 solution to 6 ozs. per gallon. Adjust the pH of No. 1 solution to 6 by adding to each 100 gallons of solution 12 fluid ozs. of 26° ammonia. The pH of No. 2 and No. 3 solutions is correct for low pH solutions. If pitting occurs, add hydrogen peroxide until it stops. No. 2 and No. 3 solutions were analyzed for lead and no lead is present in either solution.

O. J. S., Problem 5,165.

Plating Information

Q.—I am sending you a sample cap nut. Please answer the following questions:

Is the plated finish on this nut a true light statuary bronze color? If not, what shall I call it?

About what would be the cost of bronzing such nuts in lots of 18,000, or by weight?

How much more would it cost to have such nuts silver plated?

A.—The finish on the sample nut is a statuary bronze. It can be produced quite cheaply. The cost should not be more than 10 cents a hundred if done the following way:

Bright dip and plate in a basket in a cyanide copper solution for ten minutes. Rinse thoroughly in clean cold water. Bronze in a solution made of liquid sulphur 1 oz., yellow barium sulphide 1 oz., water 5 gallons. Rinse thoroughly and dry, and then tumble in clean hardwood sawdust to produce an even color. Then lacquer. The lacquering should also be done in a basket.

The cost to silver plate, if the steel ball burnishing method is used before and after plating, should be no more than the cost of statuary bronze finish.

O. J. S., Problem 5,166.

Plating Drum Sticks

Q.—I have been plating wooden drum sticks with nickel, following your directions for plating on nonmetallics as in Platers' Guidebook. However, I have found it necessary to reduce the amount of lacquer I put into the thinner when preparing the metallic powder. I only put in about a spoonful of lacquer, instead of ¼ pint.

Now, the drummers find that the nickel cracks off under the vibration in use, and on examination I find that the cracking seems to start right in the basic coating of lacquer, bronze powder and copper plate. The nickel seems to be O. K.

Can you suggest a means of overcoming this difficulty?

A.—For the class of work that you are doing, the best method to make the wood impervious would be to use a wood lacquer. This material will form a better bond between the wood and the bronze powder, and especially will this be so as you have reduced the amount of lacquer in the bronzing mixture to a point where very little adhesion is obtained.

O. J. S., Problem 5,167.

Special Finish

Q.—Please give me directions for producing finish on enclosed sample.—F. E.

A.—To produce the finish use the following solution:

Copper sulfate	8 oz.
Nickel sulfate	2 oz.
Hyposulphite soda	8 oz.
Water	1 gallon

Use the solution at boiling temperature. The work should be brass plated, and the deposit should have a smut appearance such as is produced in a solution that has a low free cyanide content, and one where no ammonia or brightener has been used.

After the color is produced, relieve the highlights with a soft muslin buff and a lime composition; then lacquer.

O. J. S., Problem 5,168.

Wax Conductor

Q.—Can you recommend a soft wax that will conduct electricity? We have tried mixing it with graphite, bronze powder, carbon, etc., with no success.

A.—We know of no wax which when mixed with graphite or carbon will conduct electricity. The wax would undoubtedly surround the fine particles of graphite and it would not be conductive.

The method that is used in plating wax molds is to coat the surface of the mold with graphite, which produces a conductive surface, and then electroplate. For method of graphiting see "Principles of Electroplating and Electroforming," by Blum and Hogaboom.

O. J. S., Problem 5,169.

Patents

A Review of Current Patents of Interest

Printed copies of patents can be obtained for 10 cents each from the Commissioner of Patents, Washington, D. C.

1,879,360. September 27, 1932. **Electric Induction Furnace.** Franz Linnhoff, Eberswalde, Germany, assignor to Ajax Electrothermic Corporation, Ajax Park, N. J.

1,879,361. September 27, 1932. **Electric Induction Furnace.** Franz Linnhoff, Eberswalde, Germany, assignor to Ajax Electrothermic Corporation, Ajax Park, N. J.

1,879,431. September 27, 1932. **Induction Electric Furnace.** Edwin Fitch Northrup, Princeton, N. J., assignor to Ajax Electrothermic Corporation, Ajax Park, Ewing Township, N. J.

1,879,505. September 27, 1932. **Organic Gold Complex Compound and Process of Making Same.** Otto Ripke, Wuppertal-Elberfeld, Germany, assignor to Winthrop Chemical Company, Inc., New York, N. Y.

1,879,701. September 27, 1932. **Protective Coating and Method of Applying Same to Nickel, Nickel Alloys, and Chromium-iron Alloys.** Anthony J. Marino, Union City, N. J.

1,879,748. September 27, 1932. **Aluminum-Silicon Alloy.** Basil T. Horsfield, Badin, N. C., and Louis W. Kempf and William L. Fink, Cleveland, Ohio, assignors to Aluminum Company of America, Pittsburgh, Pa.

1,879,819. September 27, 1932. **Conveying Mechanism.** William J. O'Neill, River Forest, Ill., assignor to Mercil Plating Equipment Company, Chicago, Ill.

1,879,908. September 27, 1932. **Apparatus for Manufacture of Hollow Silverware.** Charles R. Moon, Muncie, Ind., assignor to Ontario Manufacturing Company, Muncie, Ind.

1,879,953. September 27, 1932. **Cleansing Composition.** Walter A. Scott, Poughkeepsie, N. Y., assignor to The De Laval Separator Company, New York, N. Y.

1,880,200. October 4, 1932. **Low Expanding Alloy.** Peter Hidnert, New York, N. Y., assignor to The Government of the United States, as represented by the Secretary of Commerce.

1,880,382. October 4, 1932. **Method and Apparatus for Electroplating.** Rosner A. Garling, Lansing, and John T. Ott, Detroit, Mich., assignors to Reo Motor Car Company, Lansing, Mich.

1,880,419. October 4, 1932. **Crystallizing Lacquer Comprising Tribromo Anisole.** Robert L. Churchill, Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y.

1,880,467. October 4, 1932. **Light Metal Alloy.** Raymond J. Norton, Washington, D. C., assignor to American Magnesium Metals Corporation, Pittsburgh, Pa.

1,880,567. October 4, 1932. **Chromium Coated Articles and Method of Preparing Same.** Louis Weisberg and Willard F. Greenwald, New York, N. Y., assignors to Weisberg & Greenwald, Inc., New York, N. Y.

1,880,614. October 4, 1932. **Magnesium Alloy.** John P. Wetherill 3d, Washington, D. C., assignor to American Magnesium Metals Corporation, Pittsburgh, Pa.

1,880,746. October 4, 1932. **Lead Alloy.** George M. Bouton, Lynbrook, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y.

1,880,751. October 4, 1932. **Pickling Apparatus.** William J. Braddock, George Bruhn, and Charles W. Haller, Wheeling, W. Va., assignors to Wheeling Bronze Casting Company, a Corporation of West Virginia.

1,880,937. October 4, 1932. **Process of Carbonizing Nickel or Other Metals.** Howard M. Elsey, Oakmont, Pa., assignor to Westinghouse Electric & Manufacturing Company, a Corporation of Pennsylvania.

1,881,117. October 4, 1932. **Rotary Drum Furnace for Melting Metals.** Carl Brackelsberg, Milspe, Germany.

1,881,157. October 4, 1932. **Pickling Apparatus.** Stephen L. Williams, Bridgeport, Ohio, assignor to Extruded Metal Products Company, Bridgeport, Ohio.

1,881,257. October 4, 1932. **Wrought Metal Article.** William H. Bassett, Jr., Scarsdale, N. Y., assignor to The American Brass Company, Waterbury, Conn.

1,881,278. October 4, 1932. **Solder Wire Extrusion Press.** Conrad C. Jacobson, Glen Ridge, N. J., and James Schweder, Brooklyn, N. Y., assignors to John Robertson Co., Inc., Brooklyn, N. Y.

1,881,713. October 11, 1932. **Flexible and Adjustable Anode.** Arthur K. Laukel, Detroit, Mich.

1,881,714. October 11, 1932. **Method of Electrolytic Reproduction.** Arthur K. Laukel, Detroit, Mich.

1,881,872. October 11, 1932. **Method of Producing Aluminum and Aluminum Alloys.** Wilhelm Neumann, Lautawerk, Germany.

1,881,885. October 11, 1932. **Chromium Plating Process.** Warren Noble and Carl J. Welcome, Detroit, Mich., assignors to Electromaster, Inc., Detroit, Mich.

1,881,970. October 11, 1932. **Method of Preparing Chains for Soldering and a Composition of Matter Used in Such Preparation.** John E. Pilling, Providence, R. I.

1,882,114. October 11, 1932. **Metal Alloy for Electric Contact Terminals.** George H. Brady, Baltimore, Md., assignor to Improved Fire Detector Corporation, Baltimore, Md.

1,882,522. October 11, 1932. **Method of Joining Preformed Metallic Articles with a Galvanoplastic Body.** Gunnar Rosenqvist, Pittsburgh, Pa.

1,882,528. October 11, 1932. **Method for Reclaiming Scrap Metal.** Harry W. Thomas, Jr., Birmingham, Mich.

1,882,567. October 11, 1932. **Soldering Flux.** Albert J. Saukaitis, Philadelphia, Pa., assignor to American Chemical Paint Company, Ambler, Pa.

1,882,571. October 11, 1932. **Process of Melting Metals in Cupola Furnaces.** Marston L. Hamlin, Lynbrook, N. Y., assignor to The Barrett Company, New York, N. Y.

1,882,734. October 18, 1932. **Soldering Flux.** Clifford L. Barber, Chicago, Ill., assignor to Kester Solder Company, Chicago, Ill.

1,882,735. October 18, 1932. **Soldering Flux.** Clifford L. Barber, Chicago, Ill., assignor to Kester Solder Company, Chicago, Ill.

1,882,749. October 18, 1932. **Process for Forming Metal Alloys.** Jesse Oatman Betterton, Omaha, Nebr., assignor to American Smelting and Refining Company, New York, N. Y.

1,882,872. October 18, 1932. **Fusible Metal.** Sidney L. Palmer, San Francisco, Calif., assignor to American Smelting and Refining Company, New York, N. Y.

1,882,917. October 18, 1932. **Method of Making Ingots.** Perry C. Ripley, Chicago, Ill., assignor to Kester Solder Company, Chicago, Ill.

1,882,972. October 18, 1932. **Production of Shaped Metallic Articles.** Leo Schlecht, Ludwigshafen-on-the-Rhine, Walter Schubardt, Mannheim, and Franz Duftschmid, Heidelberg, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Germany.

1,882,998. October 18, 1932. **Process of Refining Copper.** James W. Scott, Chicago, Ill., assignor to Western Electric Company, Incorporated, New York.

1,883,650. October 18, 1932. **Contact Material.** Edgar W. Engle, Lake Forest, Ill., assignor to Fansteel Products Company, Inc., North Chicago, Ill., a Corporation of New York.

1,884,110. October 25, 1932. **Electroplating of Wax.** Francis G. Morehouse, Greenwich, Conn., assignor to Radio Corporation of America, a Corporation of Delaware.

1,885,429. November 1, 1932. **Magnesium Base Alloys.** John A. Gann and Fred L. Reynolds, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

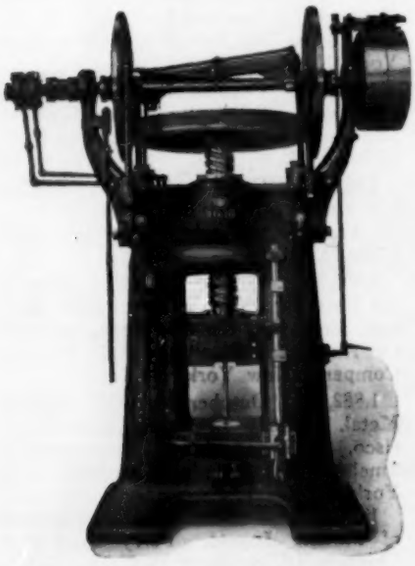
Equipment

New and Useful Devices, Metals, Machinery and Supplies

Presses for Powdered Metal Forming

There has been increasing interest in the use of powdered metals for production of shaped products, and the subject has had considerable attention in this journal's technical pages. As indicated by such discussion, it is of importance that presses of suitable design be employed in utilization of this new metallurgical process.

Zeh and Hahnemann Company, Newark, N. J., has designed a line of power presses which it declares to be eminently suited to the requirements of powder metallurgy. They are patented percussion type machines, which, the maker says, deliver a blow of a somewhat peculiar quality at a speed which is suitable for this type of work.



Press for Forming Powdered Metals

Zeh and Hahnemann "Patent Percussion" power presses are made in a large number of sizes to meet all requirements for compressing powdered metals, from very small to very large work. The machine shown in the illustration is the No. 16 size, yielding 250 tons pressure normally, is capable of being increased in power to twice that pressure, according to maker's description. It is claimed the machines are immune to overload. If an excess of powder reaches the mold, there will be no harm to either press or mold. In many cases multiple molds can be used, and loading of mold has been so developed as to provide for large production. Automatic ejectors and other auxiliaries are applicable.

It is stated in connection with these machines that at the speed at which they operate, gases and air enclosed in the metal powders are given ample time to escape.

New Armstrong Brick

A new type of brick designed for direct exposure and heat reflection is announced by the Armstrong Cork and Insulation Company, Lancaster, Pa., manufacturer of high temperature insulation. The new brick allows quick heating and eliminates heat storage, is especially suitable for electric furnaces or types of furnace construction where abrasion from movement of work or impingement of gaseous or oil fuel is not a major factor, it is stated. Adaptable for flat arch construction, the brick provides extreme strength for hanging electric elements in walls, and stands quick heating and cooling without spalling. With "EF" brick, according to the announcement, great heat reflection is secured so that equipment that ordinarily takes seven or eight hours to bring to temperature can be brought up within an hour, with resultant savings in production time and fuel cost, while the thinner wall it makes possible saves space and increases production.

Latest Products

Each month the new products or services announced by companies in the metal and finishing equipment, supply and allied lines will be given brief mention here. More extended notices may appear later on any or all of these. In the meantime, complete data can be obtained from the companies mentioned.

Motor. Ideal Electric and Manufacturing Company, Mansfield, Ohio. Pipe ventilated type; geared type.

Belt Surfacer. Gripwell Manufacturing Company, 105 West 40th Street, New York City.

Indicating Recorder. Leeds and Northrup Company, Philadelphia, Pa. New round-chart "Micromax" instrument.

Aluminum Pattern Plates. Kindt-Collins Company, Cincinnati, Ohio. Standard type raised aluminum match plates.

Rubber Plating Equipment. Joseph Stokes Rubber Company, Trenton, N. J. Hard rubber pipe and fittings, tanks, utensils, etc.

Heating Element. Harold E. Trent Company, 618 North 54th Street, Philadelphia, Pa. Spiral type elements.

Filing Machine. Grob Brothers, 90th and National Avenue, West Allis, Wis. Mechanical metal filer.

Bench Lathe. South Bend Lathe Works, South Bend, Ind. Underneath belt drive machine.

Portable Micropyrometer. Westinghouse Research Laboratories, East Pittsburgh, Pa. High accuracy instrument for determining melting points and viscosities of metals and alloys.

Testing Machine. Toledo Precision Devices, Inc., Toledo, Ohio. Universal machine for compression, tension and transverse bending tests.

Brinell Testing Device. R. Y. Ferner Company, Investment Building, Washington, D. C. Compact instrument for hardness testing of metals.

Chrome Plating Cradle. W. Canning and Company, Birmingham, England. Machine for chromium plating screw machine products and other small work.

Rod Reel. United Engineering and Foundry Company, Pittsburgh, Pa. Perrett coiling machine.

Assay Balance. Roller-Smith Company, 233 Broadway, New York. Rapid precision weighing equipment.

Radial Drill Stand. Hisey-Wolf Machine Company, Cincinnati, Ohio. New post type with sensitive rack and pinion feed adjustment.

Grinder. Hisey-Wolf Machine Company, Cincinnati, Ohio. New "Tex-Drive" type for vitrified or high speed wheels.

pH Meter. Palo-Myers, Inc., 81 Reade Street, New York City. Electric H-ion apparatus, compact, low-priced, for plating solution control.

Electric Hammer. U. S. Electrical Tool Company, Cleveland, Ohio. Light, flexible shaft type.

Header. National Machinery Company, Tiffin, Ohio. Automatic header with heating device.

Speed Reducer. Merkle-Korff Company, Morgan Street, Chicago, Ill. Compact unit with enclosed motor drive.

Manufacturing Rights Exchange. Amerika-Interessen, Inc., New York. Arranges licensing, etc., between various countries.

Sandblast Helmet. W. W. Sly Manufacturing Company, Train Avenue, Cleveland, Ohio.

Arc Welders. Harnischfeger Corporation, 440 West National Avenue, Milwaukee, Wis. Revised line, all types.

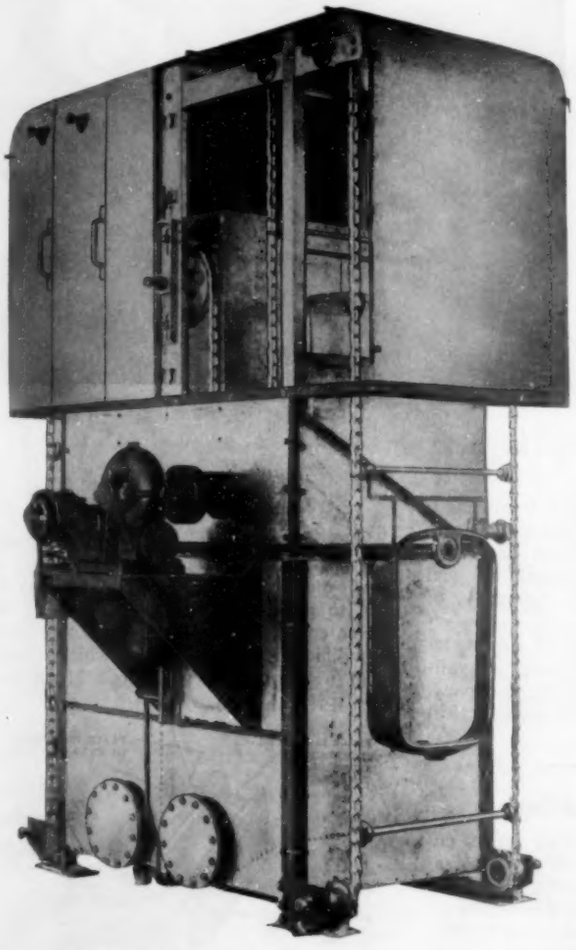
Synthetic Veneer. Di-Noc Manufacturing Company, 863 East 140th Street, Cleveland, Ohio. New coating material.

Sandblast Helmet. Pangborn Corporation, Hagerstown, Md.

New Degreasing Process and Equipment

G. S. Blakeslee and Company, 19th Street and 52nd Avenue, Chicago, Ill., has placed on the market a new type of equipment and a process for degreasing metals preparatory to plating, lacquering or otherwise finishing. The principal feature, according to the maker, is that the process degreases and cleans the metal at once, delivering work dry and ready for final finishing treatment. The machine was developed abroad and is in extensive use there, it is stated. Blakeslee has the American and Canadian rights. The process employs a solvent made by Blakeslee, known as "Blacosolv," which is stated to be recovered as the machine operates and used repeatedly. The degreaser is made in a wide variety of sizes and styles, to suit varying industrial requirements. These include hand dip as well as various automatic arrangements.

The company offers a complete booklet which describes and illustrates the process and equipment.



Left—New Blakeslee Degreasing Machine.

Copper "Sweat Fittings"

Chase Brass and Copper Company, Inc., Waterbury, Conn., is making a line of copper tube fittings which are used by a "sweating" method employing the principle of capillary attracting in soldering them. A very complete booklet outlining the various types of fittings available, the necessary equipment, and the method of operation is available from the company. It is entitled "Instructions for Use with Chase Copper Sweat Fittings." It shows how the fittings are soldered to tubes by simply cleaning and placing them together, heating the joint to the correct temperature, and touching the solder to the edge of the joint, whereupon capillary attraction causes the molten solder to flow into the joint to produce as fine a soldering job as can be made. The idea is worth the attention of all users of sweated tube joints.

New Type Lacquer

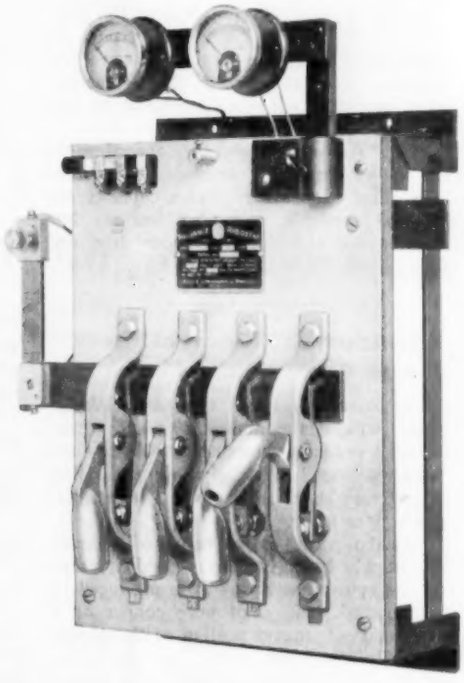
Fulle's Research Laboratory, Inc., 20 Church Street, Montclair, N. J., has developed and placed on the market a new type of lacquer for which certain remarkable properties are claimed. The material is said to be applicable to practically any type of base, either rigid or flexible, from stone and metal to fabrics and cords, and its properties are stated to include resistance to practically all ordinary attack. It is said to resist acid and alkali, water, heat, cold, stains, moisture, alcohol and other substances and effects; and to be proof against mold, odor, taste, etc. Other advantages claimed include ease of application, low cost, rapid drying. The company offers free research facilities to prospective users. A complete booklet on the material is available.

New Tank Rheostat

Chas. F. L'Hommedieu and Sons Company, 4521 Ogden Avenue, Chicago, Ill., has added to its "Reliance" line of electroplating and finishing equipment a new tank rheostat in three styles designated as Types C, CV, and CVA. The maker indicates the principal features of the device as superior appearance and durability, positive, self-closing contact, foolproof construction, and simplicity of operation. It has one movable contact.

The Type C rheostat is the basic device, while Type CV is the rheostat with voltmeter and switch, and Type CVA is the rheostat with Voltmeter, ammeter and switch. Meters are standardized in 2½ inch diameter for capacities up to 400 amperes, and 4 inch for capacities above 400 amperes.

According to L'Hommedieu, the new device is ruggedly constructed for simplicity and long life. Number of parts has been minimized. In operation, straight motion of a handle throws the resistance in or out of line, and positive eccentric action of brush makes certain that a resistance is either fully in or fully out, thus preventing arcing which burns brushes. Added safety in this respect is provided by means of a coil spring which acts to keep the brush from the bus bar when circuit is open. The device is built up on an asbestos board and has an open back, to take care of heat radiation. Interchangeable parts are used, and replacements can be made without removing the entire rheostat. The meters are mounted on brackets and can be turned to any angle for easy visibility. The Type C, without meters, can be equipped with meters at any time such change becomes desirable.



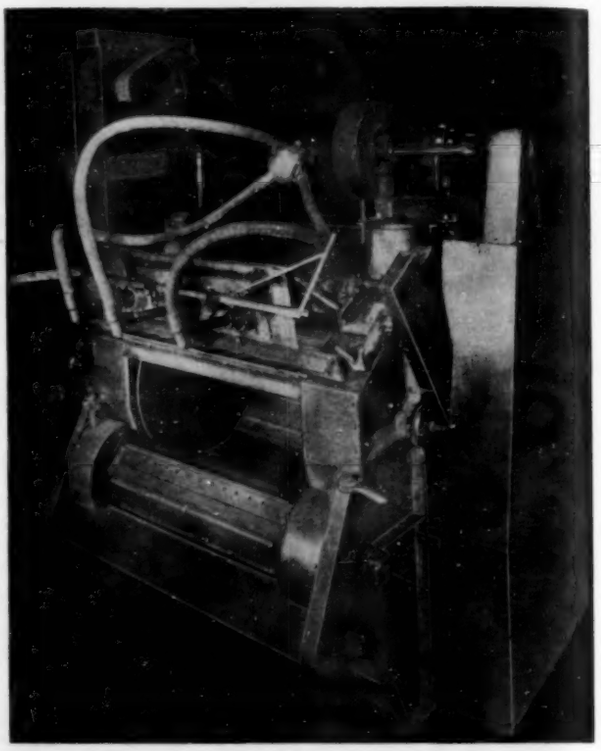
Right — New L'Hommedieu Tank Rheostat.

"Tum-Blast" Combines 2 Cleaning Processes

American Foundry Equipment Company, Mishawaka, Ind., has developed a new device for cleaning castings, known as the "Tum-Blast" cleaner. It is said by the maker to combine the advantages of the tumbling mill and the sand-blast barrel. In this device there is some deviation from both of the older processes.

The machine is open along the entire length of the cataract zone, where any number of nozzles may be mounted, in positions which will be most effective in covering work uniformly, avoiding dead zones. Nozzles may be moved to variable distances from work to permit proper placing according to nature of work. An oscillating device causes the blast stream to cover work in every part of blasting zone. Also, position of the various pieces of work is constantly changed by a conveyor which causes work to cataract into correct place. The conveyor is not subjected to the blast stream. Work is discharged from the machine by reversing motion of conveyor, and may be arranged to go directly to another conveyor for distribution, or to tote box.

The "Tum-Blast" cleaner, according to the maker, has been developed to a very high point of efficiency, has a capacity not hitherto available, and also features low maintenance and freedom from dust and flying abrasive.



New Machine for Cleaning Castings which Combines Work of Tumbling Mill and Sand Blast Barrel. Made by American Foundry Equipment Company.

Anaconda Electro-Sheet and Beryllium Copper

The American Brass Company, Waterbury, Conn., has announced two new "Anaconda" products recently. These are "Electro-Sheet," extremely thin pure sheet copper, and beryllium copper, a heat treatable copper alloy.

"Electro-Sheet" is the result of a development which received some publicity during the research stages. It is produced by the electrodeposition of pure copper on a drum and subsequent peeling of the copper film. This provides extra thin sheet copper in widths hitherto prohibitively expensive to produce by rolling. The new type of sheet is made in continuous lengths, and is rolled like strip metal. It is available in thicknesses from one ounce up to eight ounces per square foot, and in widths up to 50 inches in the one ounce material, and up to 30 inches in the other weights. Widest application so far has been for roofing, for which it is backed with fabric, and provides a highly weather resistant but economical material. New uses are rapidly being developed. Samples may be had from the maker.

Anaconda beryllium copper, according to the company, is a completely new alloy having excellent physical properties which may be greatly increased by heat treatment. Commercially useful beryllium copper ranges in composition from 1 to 2.25 per cent beryllium, balance pure copper, it is stated. The principal physical advantages claimed are high tensile strength, high fatigue limit and hardness, good abrasion resistance, high electrical and thermal conductivity depending upon heat treatment it receives, and corrosion resistance comparable to that of copper. Other properties are good machinability, weldability and color, and high scrap value (about ⅔ of base price).

A very complete bulletin on this material, Anaconda Publication B-21, is available from the American Brass Company. It gives all descriptive and metallurgical data.

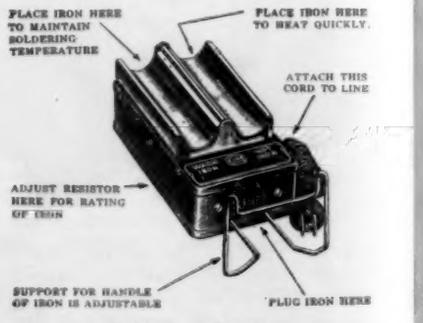
Splash-Proof Motor

A splash-proof motor which resists entrance of water splashed with terrific pressure from any angle, yet adequately ventilated and built in the same dimensions as standard open motors, is announced by The Louis Allis Company, Milwaukee, Wis. The maker states that a double baffle in an elliptical-shaped air passage in each endbell provides the remarkable protection, as it traps and drains water splashed into the air openings at the bottom of the elliptical-shaped chambers. A shaft guard breaks the force of a stream directed along the shaft extension and prevents water from entering the bearing chamber.

Formerly, this maker states, it has often been necessary to protect open motors with sheet metal covers which seriously restrict ventilation, or to install expensive fully enclosed motors in which considerable condensation occurs when operated in moist atmospheres. The new splash-proof motor offers effective and economical protection in numerous applications where motors are subjected to splashing and dripping liquids or other falling particles.

Soldering Iron Stand

G-M Laboratories, Inc., 1735 Belmont Avenue, Chicago, Ill., have announced a new type of soldering iron stand that is said to effect a saving of 30 to 40% in power consumption, and to overcome serious difficulties in soldering which result from overheated, dirty irons. Much defective soldering results from tip of iron becoming pitted and corroded. By keeping the iron, when not in use, at correct soldering temperature, the new G-M stand corrects this trouble and the tip of the iron will remain well tinned for weeks, it is claimed.


PLACE IRON HERE TO MAINTAIN SOLDERING TEMPERATURE
PLACE IRON HERE TO HEAT QUICKLY.
ATTACH THIS CORD TO LINE
ADJUST RESISTOR HERE FOR RATING OF IRON
SUPPORT FOR HANDLE OF IRON IS ADJUSTABLE
PLUG IRON HERE

Soldering Stand.

The stand provides a means of giving the iron less than line voltage during periods when it is not in steady use, and full voltage during the continued operation. Savings are thus made in both current and equipment, it is stated, which justify cost of the stand.

New Die Casting Machine

The Mad son-Kipp Corporation, 215 Waubesa Street, Madison, Wis., announces a new smal. die casting machine known as "Kipp-Caster No. 11—The Mechanical Foundry." Some of its features are its size; ability to handle all common die casting alloys, including magnesium; quick die changing arrangement; convertability into a permanent mold machine for casting brass; operation which requires no previous training or skill in the art of die casting.

The mechanism is built into a one piece body made of a semi-steel casting a yard long, which is attached to a one piece leg casting which is bench high. The essential parts are: base, body, ram, main pinion operated by spoked wheel, metal well, metal forcing plunger, plunger operating lever and die locking plunger. Operating routine is as follows:

Pressure Casting

1—Metal is poured into metal well by ladle from auxiliary furnace.
2—Dies are closed by means of spoked wheel.
3—Metal plunger lever is unlatched or pumped.

Reverse Order

1—Metal plunger lever is raised.
2—Die locking plunger is raised.
3—Dies are opened by means of spoked wheel.

Dies for use on Kipp-Caster No. 11 are identified as Kipp Cam Lock Dies. They are made of cast iron, alloy iron, or die steel, depending on the kind of metal to be cast and the length of run. They are built to definite engineering standards so that dies may be transferred from one machine to another without change. A parting line splash guard moves in unison with the movable die half but in opposite directions. To prevent metal chilling in the metal well between time of loading and casting, a small gas nozzle is introduced through the head plate so that a blue gas flame may keep the metal well casting up to proper temperature.

It requires fifteen seconds to complete a machine cycle. Production speed, however, largely depends upon the operator and his ability to co-ordinate his movements from metal ladling to casting ejection.

To convert the Kipp-Caster No. 11 from a pressure die casting machine to a permanent mold machine for gravity casting brass, one adjustment screw is turned which causes the metal well to remain stationary in its lowered position. The metal plunger and plunger handle remain inoperative, but the die is closed and opened the same as for pressure casting and core pulls and casting ejection are automatic. The gate for permanent mold castings is on top instead of on the bottom of the die as in pressure casting.

Improved Blast Helmet

Pangborn Corporation, Hagerstown, Md., announces a new type of blast helmet, called the "Health Protector" Type DF. This helmet is said to have the features of safety and comfort by providing the operator with purified, washed air, dust-proof vision window, an improved neck seal, adjustable sweat band, feather-balanced weight, every exposed surface of pure rubber, and a convenient one-hand chin strap adjustment. A very complete illustrated bulletin on this product is available from the manufacturer.

New Pangborn Helmet Cut Away to Show How it Fits

Equipment and Supply Catalogs

Available to readers free on application to manufacturers unless otherwise stated. Please mention this notice.

Belting. E. F. Houghton and Company, Philadelphia, Pa. Illustrated booklet on "Vim Tred" belts.

Anaconda Beryllium Copper. American Brass Company, Waterbury, Conn. Complete data on the newest alloy developed by the company.

Finishing Equipment. Paasche Airbrush Company, 1909 Diversey Parkway, Chicago, Ill. Bulletin B6-32, air-rubbing, polishing, sanding machines.

Conveyor Belt. The B. F. Goodrich Rubber Company, Akron, Ohio. Bulletin on "Maxecon" general service belting for foundry conveyors, etc.

Safety Instruction. National Safety Council, Chicago, Ill. Bulletin on safety instruction cards available for distribution to plant employees, executives, etc.

Electric Heat Treating Furnaces. Hevi Duty Electric Company, Milwaukee, Wis. Circular on furnaces with "atmosphere control" in heating chamber.

Rubber. The B. F. Goodrich Rubber Company, Akron, Ohio. Circular 9010 on "Armorite," a reinforced sheet rubber material for many industrial purposes.

Rubber Bearings. The B. F. Goodrich Rubber Company, Akron, Ohio. "Cutless Rubber Guide Bearings as Applied to Hydraulic Turbines," an 18-page illustrated bulletin.

Blast Helmets. Pangborn Corporation, Hagerstown, Md. Bulletin 193 on the new "Health Protector" helmets for sand and shot blasting, providing washed air and other new helmet features.

Flating Consultation. Fred J. Liscomb Electro-Plating Laboratory, 6066 Nickerson Avenue, Chicago, Ill. "Dad's Log," a leaflet containing considerable information for platers and chemists.

Welding Equipment. The Linde Air Products Company, 30 East 42nd Street, New York. Bulletins on testing apparatus: Type TM-1 portable tensile testing machine; Type TM-3 extensometer.

"A Planned System of Distribution," by H. W. Prentis, Jr., of Armstrong Cork and Insulation Company, Lancaster, Pa. Published in Executives Service Bulletin for December, 1932, issued by Metropolitan Life Insurance Company, New York.

Metallurgical Crystallograph. Adam Hilger, Ltd., 98 Kings Road, Camden Road, London, N.W.1, England. Also, Bulletin 4 on Spectrum Analysis, and a circular on pure iron rods for spectrographic purposes; Pub. No. 176 on the Nonferrous Spekker, a special spectroscope for analyzing metals rapidly.

Zinc. New Jersey Zinc Company, 160 Front Street, New York, has issued the following: **Zinc—New Uses for an Old Metal,** by Thomas J. Maloney; a very interesting reprint of an article from "Review of Reviews and World's Work." **Using Paint as Light,** a summary of a treatise by D. L. Gamble of the Research Division of The New Jersey Zinc Company, on the influence of the reflecting characteristics of wall paints upon the intensity and distribution of artificial and natural illumination.

Small Soldering Outfit

A small torch with four different tips, a soldering copper, rubber tubing and connection for the small "Presto" acetylene tank, constitutes the "Torit" soldering outfit No. 23. It is said to be handy and convenient for soldering, tempering, light brazing, wire splicing, etc., and for all sorts of small jobs requiring heat. It is not intended for welding. Connected to the Presto Tank, it is ready to go to work with the lighting of a match. No oxygen or compressed air required. The necessary air for combustion is siphoned through the tips. Full information will be given by the manufacturer, the St. Paul Welding and Manufacturing Company, 211 West 3rd Street, St. Paul, Minn.

TORIT TORCH NO 23
TIP 24, MEDIUM FLAME
TIP 20, LARGE FLAME
TIP 20, FOR RADIATOR & BATTERY WORK
TIP 23, FOR HEATING SOLDERING COPPER
SOLDERING COPPER USE WITH TIP NO 23
ADAPTER - E USE WITH TIPS 20 & 23

Torit Soldering Torch

Plates for Metallography

A photographic plate designed especially for photomicrography of metal specimens is announced by the Eastman Kodak Company, Rochester, N. Y. In addition to having properties which render it particularly suitable for metallography, it should appeal to those photomicrographers who prefer not to use panchromatic plates, such as the Wratten "M" plate, which require handling in the dark, it is stated. The Eastman research laboratories have recently produced a large number of new photographic sensitizing dyes, one of which is particularly satisfactory for sensitizing plates to be used in metallography. The plates thus sensitized are being introduced under the name of Wratten.

The Season's Greetings

METAL INDUSTRY wishes to express its thanks to the various companies and individuals who sent greetings, calendars or other tokens at Christmas and New Years:

American Brass Company, Waterbury, Conn.

Hendley N. Blackman, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

General Electric Company, Schenectady, N. Y.

Handy and Harmon, New York City.

Irving Trust Company, New York City.

R. E. Lovekin, Inc., Philadelphia, Pa.

Ernest V. Pannell, Walmley, England.

Pennsylvania Railroad, New York City.

Technical Press, New York City.

United Engineering and Foundry Company, Pittsburgh, Pa.

Weisberg and Greenwald, New York City.

West Virginia Pulp and Paper Company, New York City.

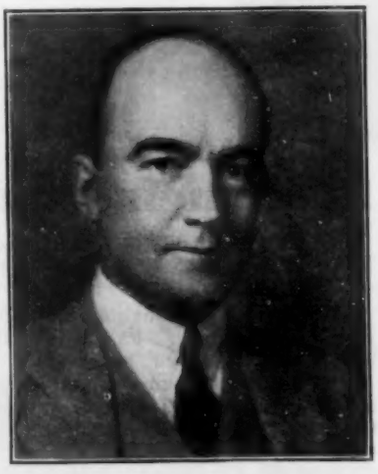
Personals

Thomas W. Pangborn

Thomas W. Pangborn, founder and active head of the Pangborn Corporation, Hagerstown, Md., has been elected vice-president of the National Founders' Association.

Born in Brooklyn, N. Y., in 1880, Mr. Pangborn was taken as a child to Minnesota and spent his childhood there. At seventeen he returned to New York, and his earliest business experience was gained in the employ of various rolling mill and foundry concerns.

He founded the Pangborn Corporation in 1904, and since that time has steadily furthered the interests of that company both here and abroad, until today it is one of the most widely known organizations specializing in sand blasting and kindred equipment for the foundry and other industrial lines.



THOMAS W. PANGBORN

Along with that of his company, Mr. Pangborn's personal prestige has grown, and his activities and responsibilities have multiplied. An instance of his influence and resourcefulness was his action last year, when he was drafted to take charge of the principal bank of Hagerstown, at a time when bank failures were causing havoc in many communities. A short time afterward, Mr. Pangborn was elected president of the Clearing House Association, which co-ordinated the policies of five banks remaining open. He continued in charge until confidence and stability were restored. During the war he was County Director of the Maryland State Fuel Administration.

Mr. Pangborn's interests extend in numerous directions, aside from the business of the Pangborn Corporation. He is a director of the Equitable Trust Company and the Maryland-Virginia Joint Stock Land Bank both of Baltimore; he is State Director of the Liberty Mutual Insurance Company, Boston; president of the Washington County Manufacturers Association; director and past-president of the Foundry Equipment Manufacturers Association.

Richard A. North has been appointed assistant chief engineer of the Farrel-Birmingham Company, Inc., Ansonia, Conn. He was formerly technical assistant to the vice-president in charge of operations of the Grace Lines, Inc., and before that he was engaged in a number of other connections in a mechanical engineering capacity, including collegiate teaching. He is a graduate of Sheffield Scientific School at Yale.

Wallace G. Smith has resigned as vice-president and sales manager of Cramp Brass and Iron Foundries Company, Philadelphia, Pa., to become sales manager of the specialties section of Baldwin Locomotive Works, Philadelphia. **James J. Nelson** succeeds Mr. Smith at the Cramp plant.

J. F. McNamara, sales manager, International Nickel Company, New York, has been named a director of the Exhibitors Committee Industrial and Power Shows, Inc., New York. **C. F. Radley,** publicity director of Oakite Products, Inc., New York, is vice-president and a director of the Committee, which is a non-profit organization which assists manufacturers by providing information on the major industrial and trade exhibitions held each year.

William S. Christy, Sr., has retired from the New York sales department of the American Brass Company, Waterbury, Conn., after 50 years of service to the brass industry. Mr. Christy began his career with Holmes, Booth and Hayden, New York, as a clerk, and progressed steadily. When the company was merged with American Brass in 1901 he continued with the Anaconda subsidiary.

Charles W. Lacey, formerly factory manager, is now general manager of International Chemical Company, Philadelphia, Pa., specialists in metal cleaners and lubricants for the metal working industry. He takes the place of the late S. D. Benoliel.

Walter C. Allen, for the past 17 years president of Yale and Towne Manufacturing Company, New York, has been elected board chairman to succeed **Schyler Merritt,** who resigned, due to his election to Congress. W. Gibson Carey, Jr., for some years vice-president and treasurer, has been elected president and will continue as treasurer also.

Obituaries

Kenneth W. Jacobs

Kenneth W. Jacobs, Sr., founder and president for many years of the Standard Brass Works, Milwaukee, Wis., died at the age of 71 on November 26, 1932. He had retired from active business several years prior to his death, and gone to live in Florida, but died at Milwaukee while visiting his sons.

Kenneth W. Jacobs was one of Milwaukee's most energetic and successful citizens, and is credited with having contributed greatly to the city's development and progress. Born at Saulk City, Wis., in 1861, he was educated in the public schools and the State Normal School. As a boy he identified himself with his father's cooperage business, and later

KENNETH W. JACOBS

joined Dewey and Davis, merchants. After that he went to W. M. Brigham Company, commission merchants, of which his father was a partner. For some years he was engaged in a variety of business projects in various parts of the state, in 1900 buying the Warner-Schenk Company, Milwaukee, which he combined with his own business, the Standard Brass and Iron Works, now known as the Standard Brass Works. He also took over and operated his father's cooperage plant after the latter's death. He headed both concerns until 1925, when he retired from active business.

Mr. Jacobs was widely known for his civic and fraternal activities, as well as his business enterprise.

He is survived by his widow, Mrs. Clara Belle Jacobs, and three sons, Roy M. Jacobs, who is president and treasurer of the foundry concern; and Burleigh E., and Kenneth W. Jacobs, Jr.

S. D. Benoliel

The death of S. D. Benoliel, founder and general manager of the International Chemical Company, Philadelphia, Pa., on November 23, 1932, as reported here last month, brought to a close a useful and very interesting career.

Mr. Benoliel was born in New York City, June 1, 1874. After graduating from the public schools he continued his education with a five-year scientific course at the College of the City of New York, which led to the degree of B.S. in 1893. This was followed by a three-year course at the School of Mines, Columbia University, with the degree of E.E., and additional work at the School of Pure Science, Columbia University, with the degree of A.M. During 1896 and '97 Mr. Benoliel practiced general engineering.

In 1897 he married Theresa Lindemann of New York, and during the same year was called to the faculty of the Adelphi College, Brooklyn, as assistant professor of chemistry, physics and electricity, until 1901. In 1901 he decided to go into business, and joined the Roberts Chemical Company, Niagara Falls, N. Y. (now the Niagara Alkali Company), as electrochemist and general manager. At Niagara Falls Mr. Benoliel developed a process for manufacturing caustic potash by the electrolytic method. He not only succeeded in doing this, but was the first man in the world to produce chemically pure hydrochloric acid by electrolysis. The potash made at the Falls was the first commercial caustic potash ever made in America. It then had a very limited market, and in looking around for an outlet Mr. Benoliel's interest was directed toward the field of industrial cleaning.

After considerable research and field experiment, Mr. Benoliel went to Camden, N. J., in 1905, to found the International Chemical Company, the first concern to specialize in scientific industrial cleaning. In 1920 a new plant and general offices were opened in Philadelphia. Mr. Benoliel was not only a pioneer in industrial cleaning, but was an acknowledged authority on cleaners and lubricants for the metal trade, playing a very considerable part in the development of this field. He retained an active interest in the affairs of the company up to the time of his death, and built up an organization which will continue the business and carry on the development work which he started. Charles W. Lacey, who had been associated with Mr. Benoliel since the founding of the company as factory manager, will succeed him as general manager.

Mr. Benoliel had many outside interests, having been a member of a number of financial, educational and social clubs and organizations, including The Electrochemical Society, American Chemical Society, American Institute of Electrical Engineers, Engineers' Club of Philadelphia. He had been president of the Columbia University Alumni Club of Philadelphia, of the Home and School League of Philadelphia; member, Geographical Society of Philadelphia, charter member of the Pi Lambda Phi Fraternity; member of the Civic and the Penn Athletic Clubs of Philadelphia. He was also the author of numerous articles on electrical subjects, liquid air, Finsen's photo-therapy, and industrial cleaning.

Mr. Benoliel was very widely known and had many friends in the trade who will feel a deep personal regret in his passing. Because of his humanity and friendship, he occupied a high place in the affections of his employes and associates, who will keenly feel his loss.

Lewis H. Jones

Brief mention was made here last month of the death of Lewis H. Jones of Detroit, Mich., on October 27, 1932, after a protracted illness.

Lewis H. Jones was born in Detroit. He attended the public schools there, and also a business college, after which he began his business career in the

LEWIS H. JONES

humble post of bank messenger. He early displayed his abilities, and before long he rose to the position of collection clerk at the bank. However, he had an ambition to go west and enter the mining field, which he did as soon as an opportunity appeared. After some time in Colorado he returned to Detroit to do some very important accounting work. He went west again, but again came back to Detroit to join the old Detroit Copper and Brass Rolling Mills, whose accounting system he revised so well that he was made assistant secretary of the firm. Then he began his real career as an industrial leader, rising finally to the presidency of the company, which expanded into one of the largest nonferrous rolling concerns in the country.

Mr. Jones was for a long time general manager of the company, and under his able leadership it progressed steadily. It became a highly important factor in the midwest industrial field, and it was fin-

ally, in 1927, taken over by the American Brass Company, of which it is today the midwestern branch. On its acquisition by the Anaconda subsidiary, Mr. Jones became associated with American Brass as a vice-president. He retired from active business a few years ago, but retained directorships in a number of major companies, banks, etc.

Andrew C. Dallas

Andrew Chisholm Dallas, until 1917 chairman of the Dallas Brass and Copper Company, Chicago, Ill., died December 10, 1932, aged 83. Born in Canada, Mr. Dallas went to Chicago in 1891 and entered the lumber business. He joined Benedict and Burnham Company in 1906 as sales manager in the Chicago district. In 1908 he organized A. C. Dallas and Son Company, a metal jobbing business. He progressed steadily and entered the manufacturing field. The firm name was changed later to Dallas Brass and Copper Company, with the son, C. D. Dallas as president and the father as board chairman until 1917, when the latter retired. The company became a unit of Revere Copper and Brass, Inc., in 1928.

William A. Gray

William A. Gray, treasurer of the Crescent Brass and Pin Company, Detroit, Mich., died December 6, 1932, at the age of 76. He was widely known in Detroit industrial circles and was a pioneer in automobile ignition development. His firm made ignition systems and spark coils for Ford cars for many years, and Mr. Gray aided Henry Ford years ago when Ford built his first racing automobiles.

Samuel K. Reeves

Samuel K. Reeves, former member of Paul S. Reeves and Company, Philadelphia, Pa., now part of American Manganese Bronze Company, died December 2, 1932, aged 61. Mr. Reeves retired from the metal field last spring when the Reeves firm was consolidated with American Manganese. He had been in the metal business since 1893.

Gerald E. Brownell

Gerald E. Brownell, superintendent of the grinding machine division of Norton Company, Worcester, Mass., died October 30, 1932, aged 58. He had been with Norton for 31 years. He started as supervisor of grinding machine installation, later became general foreman, assistant superintendent, and finally, in 1920, superintendent.

August Soffel

August Soffel, until 1913 head of the Woodside Sterling Company, Newark, N. J., died December 14, 1932, aged 68. Mr. Soffel was a graduate of the school of science of Cooper Union, New York, and a silversmith. He founded the Woodside company in Brooklyn, N. Y., and in 1893 moved it to Newark.

Colonel Robert Streeter

Colonel Robert Streeter, consulting engineer and formerly chief mechanical engineer of the United States Aluminum Company, New Kensington, Pa., died December 10, 1932, aged 52. Col. Streeter served as commandant of the Rock Island, Ill., Arsenal during the war. He joined the aluminum company in 1919. He was author of a number of textbooks on gas engine design.

Stephen S. Tuthill

Stephen S. Tuthill, formerly secretary of the American Zinc Institute, and widely known as an expert in traffic matters, died at his home in Brooklyn, N. Y., December 1, 1932, aged 63. He had been in poor health for two years.

Mr. Tuthill is known throughout the country in metal circles for his work with the Zinc Institute, which he managed for a number of years. He was a resident of Brooklyn for 40 years, and there he was active in civic matters, having been president of the Kings County Grand Jurors Association, chairman of that organization's traffic committee, and vice-chairman of the Brooklyn Safety Council. He was instrumental in curbing accidents on the streets, and also interested himself in crime elimination.

Andrew Thompson

Andrew Thompson, vice-president and general manager of Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., died December 8, 1932, aged 55. He was also president of the Embossing Company, Albany, N. Y. He joined the Titanium company in 1912.

Ernest Gordon

Ernest Gordon, superintendent of the Brass division of the Jarecki Manufacturing Company, Erie, Pa., died recently at the age of 75. Mr. Gordon had been with the Jarecki company for 53 years.

News of Associations

American Electroplaters' Society

Research Fund

Contributions to the Research Fund of the American Electroplaters' Society for the month of December, 1932, amounted to $1,050. The contributors during that period were:

General Motors Corp., Detroit, Mich., $25.00; *The Chase Co., Waterbury, Conn., $25.00; *Egyptian Lacquer Co., New York, $50.00; *Hanson Van Winkle Munning Co., Matawan, N. J., $50.00; Delco Products Co. Inc., Dayton, Ohio, $25.00; *International Nickel Co., New York, $50.00; Blake Mfg. Corp., Springfield, Mass., $10.00; Parker Rust Proof Co., Detroit, Mich., $25.00; J. B. Ford Sales Co., Wyandotte, Mich., $25.00; *Scovill Mfg. Co., Waterbury, Conn., $100.00; Frigidaire Corp., Dayton, Ohio, $25.00; *P. & F. Corbin Co., New Britain, Conn., $100.00; Aluminum Colors Co., Indianapolis, Ind., $10.00; Delco-Remy Corp., Anderson, Ind., $25.00; Victor Casket Hardware Co., Galesburg, Ill., $15.00; *Speakman Mfg. Co., Wilmington, Del., $25.00; Arrow Plating Co., Chicago, Ill., $5.00; The Foxboro Co., Foxboro, Mass., $5.00; Knapp-Monarch Co., Belleville, Ill., $25.00; Frank J. Clark, Springfield, Mass., $10.00; United Chromium Corp., Detroit, Mich., $50.00; General Electric X-Ray Corp., $25.00; Roessler-Hasslacher Corp., New York, $50.00; Lustro Coated Sheets Co., Pittsburgh, Pa., $5.00; Canada Cycle & Motor Co., Western Ontario, Can., $25.00; City Auto Stamping Co., Toledo, Ohio, $25.00; Westinghouse Electric & Mfg. Co., Pittsburgh, Pa., $50.00; Greer Steel Co., Dover, Ohio, $25.00; The Crane Co., Chicago, Ill., $25.00; METAL INDUSTRY, New York, $70 (adv. space); "Brass World," New York, $70 (adv. space); "Metals and Alloys," $70 (adv. space).

*An asterisk prefix denotes a regular subscriber. All others are either new or renewing subscribers.

It is again desired to point out that the Research Fund is used for the purpose of carrying on research work in electroplating, mainly in collaboration with the United States Bureau of Standards. The Society urges all companies and individuals interested in the progress of the electroplating and related industries to contribute to the Fund.

Subscriptions may be sent to the Secretary-Treasurer of the Research Fund, Walter Fraine, 507 Grand Avenue, Dayton, Ohio, or to any of the following officers and members of the committee:

Jacob Hay, Chairman, 18004 East Park Drive, Cleveland, Ohio.

W. M. Phillips, Vice-Chairman, R. F. D. No. 1 Hunt & Southfield Rd., Birmingham, Mich.

Dr. Wm. Blum, Bureau of Standards, Washington, D. C.

Dr. A. K. Graham, 34th and Spruce Sts., Philadelphia, Pa.

Dr. O. P. Watts, 114 Spooner St., Madison, Wis.

Walter S. Barrows, 628 Doverscourt Rd., Toronto, Ont., Canada.

E. J. Musick, 206 S. Ninth St., St. Louis, Mo.

M. D. Rynkofs, 1350 W. 25th St., Los Angeles, Cal.

O. J. Sizelove, 919 Chancellor Ave., Irvington, N. J.

RESEARCH COMMITTEE, A.E.S.

Baltimore-Washington Branch

The Baltimore-Washington Branch of the American Electroplaters' Society will hold its annual stag dinner at 7 P.M., Saturday, February 4, 1933, at Louis Hasslinger's Restaurant, Charles and Lanvale Streets, (opposite Penn Station), Baltimore.

All persons interested in plating and finishing are invited to attend. Dinner will be $1 per plate. After the dinner, technical papers will be read. The program includes an illustrated talk on The Results of Exposure Tests of Plated Surfaces made by the A. E. S. Research Committee during 1932, by Dr. William Blum of the Bureau of Standards, and Paul W. S. Strausser, and other papers.

New York Branch

The New York Branch will hold its 24th annual educational session and banquet on Saturday, February 18, at the Aldine Club, 200 Fifth Avenue, New York City. The session will begin at 3:30 P. M. and will be open to anyone interested in metal plating and finishing. Manufacturers, chemists and platers are invited.

The banquet will begin at 7:00 P. M. Tickets, which are $3.50 this year, for advance reservations are available from John E. Sterling, secretary, 2540 Steinway Street, Astoria, Long Island, N. Y.

American Electro-Platers' Society

Executive Committee, 1933 Convention, Chicago

F. H. HANLON
General Chairman

C. S. TOMPKINS
General Secretary

All communications regarding the convention should be addressed to the general secretary, at 6916 Clyde Avenue, Apt. 303, Chicago, Ill.

CHICAGO AS A TRANSPORTATION CENTER

When you come to the Chicago Convention next June, you will use some mode of transportation; it may be railroad, airplane, boat, electric interurban, bus, or your own auto. Here are some facts on Chicago's transportation facilities.

Railroads: Chicago is the largest railroad center in the world. Thirty-eight railroads including twenty-three trunk lines terminate in Chicago. No train passes through Chicago. Seven belt and switching roads connecting with eight industrial lines, having a total of over 1400 miles of track—one-third of the belt line mileage of the United States, are available to handle Chicago's industrial output.

Over 380,000 passengers arrive at or depart from Chicago stations daily, on 550 through trains and 1,500 suburban trains.

Elevated lines with 227 miles of single track operate 1,850 cars and carry 227,000,000 passengers annually. Surface lines have 1,080 miles of single track, and are equipped with 3,639 cars which carry 882,000,000 passengers annually.

Airplanes: Chicago is the air transfer center of the United States. It is equipped with twenty airports, and every 24 hours 64 planes arrive and depart on 11 routes. Total passengers carried in 1931 were 91,367. There are 32 air mail planes entering or leaving the 320-acre Chicago Municipal Airport daily.

Boats: Commerce by water of the Chicago Industrial District aggregates 11 per cent of the total of all United States ports. Thirteen steamship lines serve Chicago.

Electric Interurban Lines: Five electric lines enter the city; three furnish freight service in addition to regular passenger service. This service extends on the north to Milwaukee, west to Elgin and Aurora, south and east to Gary, Michigan City and South Bend.

Buses: Fifteen large motor bus lines operate out of Chicago from coast to coast, and to all leading cities.

Autos: Chicago has 3,623 miles of streets, of which 3,073 miles were paved at the end of 1931. Illinois has 9,070 miles of hard roads, one-seventh of all the concrete pavement in the United States.

With all these modern, fast and convenient methods of travel, your transportation problems are solved. The only problem is your determination to use the "I WILL" spirit which will bring you to Chicago for the American Electro-Platers' Society Convention in June, 1933. Lest you forget the exact dates, they are the 27-28-29-30.

We'll be seein' you at the Congress Hotel.

Convention—June 27, 28, 29, 30

With all these transportation facilities available, there will be no difficulty in reaching the Annual Convention of the American Electroplaters' Society which will take place at the Congress Hotel, June 27-30, 1933. It will be the opportunity of a lifetime to take in a world's fair—The Century of Progress Exposition—and attend your Society's convention at the same time. Members are urged to start a fund for the purpose, so that

We'll be seein' you,

1933 CONVENTION COMMITTEE.

Electrochemical Society

The last meeting of the Metropolitan Section of The Electrochemical Society was held at Elizabeth, N. J. F. H. Driggs of the research laboratory of Westinghouse Lamp Company discussed preparation of rare metals in highly purified form by means of electrolysis of fused salts.

Connecticut Non-Ferrous Foundrymen's Association

At the December meeting the following were elected officers of the Connecticut Non-Ferrous Foundrymen's Association for 1933:

President, C. H. Blanchard of Reading, Pratt and Cady Company, Hartford; vice-president, George Belknap of Belknap Manufacturing Company, Bridgeport; treasurer, H. A. Phelps, Phelps Foundry Company, Ansonia; secretary, Dave Tamor of Reading, Pratt and Cady, 556 Capitol Avenue, Hartford, Conn., Executive Committee was elected as follows: Chairman, C. D. Elliott of Wilcox, Crittenden Company, Middletown; O. G. Willey of Jenkins Brothers Company, Bridgeport; Ben Stewart of Benjamin Stewart and Sons, Mt. Carmel; G. F. Winslow of Bradley and Hubbard Company, Meriden. Entertainment and speakers committee: Louis G. Tarantino, Chairman; Wesley Case, Dave Tamor.

Guest speaker at the December meeting was Ralph E. Smith, metallurgist, of the Aluminum Company of America, Fairfield, Conn., plant; the subject was Foundry Practice with Aluminum Alloys. D. J. McNulty of the same company's sales engineering staff assisted the speaker in answering many questions of the members.

The interest shown at the past few meetings indicates that an increasing number of Connecticut foundrymen appreciate the benefits to be derived from attendance. The next meeting takes place January 9, 1933. Regular meeting place is Hotel Garde, New Haven; meetings generally are preceded by dinner at 6:30 P.M.

Major Meetings in 1933

American Electroplaters' Society, Annual Convention, Congress Hotel, Chicago, Ill., June 27, 28, 29, 30.

American Foundrymen's Association, Annual Convention and Exposition, Stevens Hotel, Chicago, Ill., week of June 19.

The Electrochemical Society, Spring meeting, Hotel Windsor, Montreal, Canada, May 11, 12, 13; Fall meeting, Chicago, Ill., September 7, 8, 9.

American Society for Testing Materials, 1933 Meeting and Second Exhibit of Testing Apparatus, Stevens Hotel, Chicago, Ill., June 26, 27, 28, 29, 30.

Institute of Metals Division, A.I.M.E., Annual Meeting, Engineering Building, 29 West 39th Street, New York, February 20, 21, 22, 23.

British Institute of Metals, 25th Annual General Meeting, London, March 8, 9; General Meeting and Annual May Lecture, London, May 10.

Industrial and Financial News

Magnuson Adds Western Warehouse Braneches

Magnuson Products Corporation, Brooklyn, N. Y., manufacturers of industrial cleaners, in December opened a warehouse at Los Angeles, Calif., which is the fourth Pacific Coast point at which the company now has supplies of its products for rapid distribution.

The Magnuson Company has been steadily expanding its western activities, according to S. M. Hendrickson, assistant general manager. Entering the Pacific Coast area about 18 months ago, it appointed Frank Lee as West Coast divisional manager, and placed warehouse stocks at San Francisco and Oakland, Calif. During the past year a warehouse was opened at Seattle, Wash., and now Los Angeles has a Magnuson branch. Operating under the general direction of Mr. Lee, each of these branches has a Magnuson representative experienced in the industrial cleaner line. Also, in 1932, a warehouse was set up at Houston, Texas, and an additional representative was placed in the St. Paul-Minneapolis area.

The company now has warehouse stocks at seventeen strategic points covering the entire United States, with additional representation at many cities where stocks are not kept. Expansion was continued throughout 1932 in the belief that business is bound to turn upward before long, and, says Mr. Hendrickson, "when it does we want to be in a position to care for it." The remarkable progress of the company, which started only nine years ago, has no doubt been due in a measure to this forward-looking policy.

Say Seaway Pact Will Aid Aluminum Company

The New York State Power Authority last month declared before a Senate committee that the pending St. Lawrence waterway treaty between Canada and the United States fails to protect the interests of New York State. It was mentioned among other things that the Aluminum Company of America, which has a power canal at Massena, N. Y., will gain certain water diversion advantages. The State Department disputed the contention.

Jewelry School Report

The Rhode Island School of Design, Providence, R. I., which devotes considerable attention to jewelry and silversmithing due to the proximity and interest of those industries, last month reported to the New England Jewelers and Silversmiths Association that considerable progress had been made toward improving the curriculum and policy. It will emphasize practical design, production and research, with a view to providing experts to the industry. A plan for co-operation between school and industry, for the mutual benefit of students and manufacturers, was outlined.

Metal Developments

PURPLE GOLD taken from the tomb of Tutankhamen in Egypt has been reproduced at Johns Hopkins University by Professor R. W. Wood, who reported it to a meeting of scientists at Atlantic City last month. He found that gold, iron and yellow arsenic were used, being heated and hammered.

BRASS is being more extensively used for edging of skis, for which demand has been increasing due to greater interest in winter sports.

DEFECTIVE LIGHTING is a cause of considerable harm to industrial employes, and of increased manufacturing costs, according to New York State Labor Department, which offers free lighting advice.

Course in Plating

The course in Practical Electroplating at the College of the City of New York commences its spring term on February 9th. The class will meet Monday and Wednesday evenings from 7 to 11 in the chemistry building, Amsterdam Avenue and 139th Street, New York City. Lectures and laboratory work will be conducted personally by Dr. L. C. Pan. The work is arranged to meet individual needs.

The course is open to all persons interested in electroplating, metal finishing and chemical control of plating solutions. Registration may be made in person, or by mail, enclosing check or money order for $37.50 payable to "Board of Higher Education," address: Evening Session, Room 100, Main Building, City College, 139th Street and Convent Avenue, New York City.

Courses for Engineers

Unemployed engineers will have an opportunity to improve their knowledge of business finance, sales engineering, power plant engineering, structures and mechanical equipment of buildings, industrial electricity, or industrial management, through co-operative activity of engineering societies and colleges in the New York-New Jersey metropolitan district, under auspices of the Engineering Foundation, 29 West 39th Street, New York. P. H. Littlefield, manager, will take care of applications.

Industrial Exhibition

A one-month exhibition of new materials, new products and new uses, assembled by the National Alliance of Art and Industry, opens January 16, at Art Center Galleries, 65 East 56th Street, New York City. Metals and finishes will figure prominently.

Chromium Case Taken to Supreme Court

International Silver Company, Meriden, Conn., last month carried the chromium plating patent case to the United States Supreme Court, where it filed a petition seeking reversal of the decision of the Circuit Court of Appeals for the Second Circuit that the Fink Patent No. 1581188, assigned to United Chromium, Inc., respondents, discloses an invention and is valid. The following summary of the petition and brief is from the "United States Daily":

"The factors of current density, temperature of operation, etc., recommended in the patent are substantially the same as those recommended in the Sargeant article, but the patent claims that it is the sulfate radical in the Sargeant plating bath which is the effective activating agent, acting as a catalyst to promote the plating reaction, the petitioner's brief states. The lower court found that the critical element in the composition of the bath had not been found by Sargeant or anyone else prior to Fink.

"In a suit for infringement, the district court upheld the validity of the patent on the ground that the regulation of the plating bath constituted the invention of the patent. The court of appeals, according to the petitioner, 'sustained the patent as valid on the ground that the prior art nowhere disclosed the scientific principle expounded by the patentee, namely, that the sulfate "radical" of the bath acted as a catalyst in the plating operation and that novelty and invention resided in the original subject matter of the claims, notwithstanding the disclaimer and the sworn statement of the applicant that he was not the first and original inventor of such subject matter.'

"In sustaining the patent, the petitioner's brief contends, the court of appeals has given 'an unwarranted significance to the factor of commercial success.' The question presented, it is urged is not one of invention but of novelty.

"'Mr. Sargeant disclosed the arts of the process of chromium plating now universally used, but made no attempt to commercialize the process himself,' the brief states. 'That Fink and his assignee may have been the first to utilize the Sargeant discoveries on a commercial scale is of no significance.'

"The court of appeals held that 'in the case at bar the regulation of the bath was not the invention; it was a trivial part of the claims. What Fink really did was to single out the acid radical as the catalyst, disregarding the substance which happened to contain it. Nobody thought of this before and for that reason nobody has found a dependable process.'"

Metals at Power Show

The Tenth National Exposition of Power and Mechanical Engineering, held last month at New York, again disclosed the importance of the nonferrous metals in the field of power generation and transmission. Hardly an exhibit was to be found which did not use metal in some form, and there were a number of displays by metal or allied equipment companies. These included the following:

A. Allan and Son; American Brass Company; American Blower Corporation; American Gas Association; American Metal Hose Company; Armstrong Cork and Insulation Company; Babcock and Wilcox; Black and Decker Manufacturing Company; Botfield Refractories Company; Bristol Company; Brown Instrument Company; Carborundum Company; Carrier Engineering Company; Chase Brass and Copper Company; Detroit Seamless Steel Tubes Company; Eagle-Picher Lead Company; Foxboro Company; General Electric Company; Harbison Walker Refractories Company; Hisey-Wolf Machine Company; E. F. Houghton and Company; International Nickel Company; Parker Appliance Company; Production Machine Company; Pyrometer Instrument Company; Sarco Company; Schwenk Safety Device Corporation; C. J. Tagliabue Manufacturing Company; Taylor Instrument Company; Wolverine Tube Company.

Drafting and Structural Engineering Courses

Stuyvesant Evening Trade School, 345 East 15th Street, New York City, offers a course in trade drafting and structural engineering, Tuesday and Thursday evenings. Registration should be by personal or mail application to the school.

Engineering Materials

Charles H. Hughes, engineer, of 2681 Amboy Road, New Dorp, Staten Island, N. Y., is at work on a book on engineering materials for students, draftsmen and engineers, and desires literature and data on such materials from companies producing them.

Census Nearly Finished

W. M. Steuart, director of the census, Washington, D. C., reports that the fifteenth decennial census will be completed by December 31, end of the 3-year legal limit. Of interest to industry will be figures on unemployment, manufactures, distribution, construction, the last two being new features. Following competition of that, the Census Bureau will proceed with other compilations, including the biennial census of manufactures.

Russia Buys Aluminum

Aluminium Ltd., Montreal, Canada, last month issued a statement that the Soviet government has placed an order for Canadian aluminum to the amount of $1,000,000, mainly consisting of high voltage transmission wire. It was officially denied by the company that this or former business was done on a barter basis for Russian oil. The company declared it accepted Russian credits without reference to what the credits were for.

New Burns Representative

E. Reed Burns and Sons, Inc., 21 Jackson Street, Brooklyn, N. Y., has appointed Carl E. Heil district representative for Cleveland and northern Ohio, with headquarters at 17435 Lake Avenue, Lakewood, Ohio.

Mr. Heil has had 15 years' experience as a metallurgical engineer; has specialized on metal surface and corrosion problems; and will give sales engineering service to the industries using polishing and buffing supplies.

Corporation Tax Refunds

Tax refunds reported for 1932 by the United States Treasury Department included the following:

Metal and Thermit Corporation, New York, $15,526; Torrington Company, Torrington, Conn., $96,582 and $7,928; Winchester Repeating Arms Company, now Winchester Manufacturing Company, $253,649; Yale and Towne Manufacturing Company, Stamford, Conn., $9,925; Champion Copper Company, Boston, Mass., $25,419; Iron Cap Copper Company, $11,592; Norton Company, Worcester, Mass., $487,448; Aluminum Company of America, Pittsburgh, Pa., $91,495; American Refractories Company, Pittsburgh, Pa., $43,955.

Business Items—Verified

Campbell-Hausfeld Company, Harrison, Ohio, manufacturer of metal melting furnaces, sprayers, etc., is enlarging its line to include holding furnaces, and furnaces for various bath solutions.

Stanley Manufacturing Company, Dayton, Ohio, has merged with **Fogarty Manufacturing Company,** same city. Both are large producers of metal name plates, novelties, display fixtures, etc.

Handy and Harmon, precious metals, announces the removal of its executive offices to 82 Fulton Street, New York City, where the New York plant is located. New telephone number of the offices and plant is BEekman 3-2460.

Alloy Metal Wire Company, Moore, Pa., reports it is operating on full time schedule, and has been adding equipment to take care of expanding business in bright annealed stainless steel wire, rod and strip.

Republic Lead Equipment Company, Cleveland, Ohio, has succeeded to business of **Gross Lead Burning and Coating Corporation,** and will continue in same line, specializing in lead chemical equipment, plating tanks, etc. **L. R. Schlundt** is manager.

Belleau and Malo Company, Providence, R. I., reports increased business in copper house heating radiators. Automatic machinery has been installed in plant. Company uses quantities of copper sheet, brass tubing, etc., and does stamping, soldering and brazing. **Joseph Belleau** is in charge.

Benjamin Stewart and Sons, Inc., Mt. Carmel, Conn., has started operations in the former Mt. Carmel Bronze and Brass foundry, doing production and jobbing work in all nonferrous metals. **Ben Stewart,** head of the firm, was formerly with the **Deoxidized Bronze Company,** Bridgeport, Conn.

Gould's Pumps, Inc., Seneca Falls, N. Y., has acquired Hydroil Corporation, Lebanon, Ind., manaufacturers of oil purifying apparatus. Lebanon plant is being discontinued and equipment transferred to Seneca Falls. **D. B. Clark,** vice-president of Hydroil, and **W. P. Alexander,** representative, will join Gould, which will continue to manufacture Hydroil products.

Incorporations

Nelson Brothers Metal Ornaments, Inc., Brooklyn, N. Y., by Benjamin Nelson, 464 East 96th Street, and L. Nelson, 58 East 52nd Street, Brooklyn; to manufacture metal goods.

Hoffman Gas and Electric Heater Company, Louisville, Ky., recently organized, has purchased **Hoffman Heater Company,** and plans increased production of both gas and electric heaters. **W. H. Bowman, Jr.,** is head of the company.

Thomas Engineering Corporation, Wesleyville, Pa., headed by **G. V. Thomas,** has purchased the patents and facilities for manufacture of R. E. Byrd die casting equipment, and will proceed to manufacture and market machines and to take die casting business on contract. **O. J. Baier** is also interested in the firm.

Amesbury Metal Products Company, Inc., Amesbury, Mass., recently organized, has taken over plant of Aga Auto Lamp Company, which it will operate as a unit. Company also makes vending machines, cabinets, commercial stampings and spinnings. It operates brass machine shop, spinning, stamping, tinning, soldering, brazing, polishing, plating, grinding, lacquering and japanning departments.

News From Metal Industry Correspondents

New England States

Waterbury, Connecticut

JANUARY 3, 1933.

Due to the slight but perceptible increase in business during the past four months, local manufacturing interests look toward the new year with some hope. However, all are guarded in expressions of opinion as they have seen apparent pick-ups in the past two years that did not last.

The manufacturers are showing optimism by the support they are giving the Industrial Rehabilitation program calling for purchases of equipment and employment of labor on jobs involving modernizing and replacement of their plants. **John H. Goss,** vice-president of the **Scovill Manufacturing Company,** chairman of the state committee, has organized local committees in most of the industrial sections of the state. **C. F. Hollister,** treasurer of the **American Brass Company,** has been appointed chairman of the Waterbury committee which is seeking pledges from industrial and business firms and individuals to make expenditures now for improvements and replacements which they have had in mind for the future, on the premise that such work can be done more cheaply now. It is felt that most firms have held up such plans because of tight money and the fear that prices have not yet reached bottom. Already, American Brass and Scovill have outlined plans for such improvement, it is understood.

Announcement that **Waterbury Fastener Company** is moving its machinery to the plant of **F. G. Quigan Company,** Brooklyn, N. Y., with which it merged recently, caused the report that the **Beardsley and Wolcott Company** plant nearby was going to move. This is denied by **R. S. Booth,** superintendent of the latter plant, who says the company is quite satisfied with business just now and has no intention of moving. Waterbury Fastener, which employed about 100, took about eight skilled employes to New York, including the superintendent, **John Ford.** W. R. B.

Connecticut Notes

JANUARY 3, 1933.

NEW BRITAIN.—Hart and Hutchinson Company has changed its name to **Hart, Cooley, Highton Company.** Inclusion of the name Highton is to associate the name of one of its products. A few years ago the business of William Highton & Sons of Nashua, N. H., was acquired. Hart and Cooley, Inc., is a holding company which owns the shares of the Fafnir Bearing Company, Hart and Hutchinson, and the Hart and Cooley Manufacturing Company.

Russell and Erwin Manufacturing Company, branch of American Hardware Corporation, has been awarded contract for hardware for the new $3,000,000 building to be erected for the Christian Science Publishing Company in Boston.

BRISTOL.—During November, industrial activity here forged ahead, although there was a let-down in the rest of Hartford county, the County Manufacturers association reports. The 14 principal factories added 79 employes to their payrolls and stepped up the number of hours per week per man from 33.4 to 37.2. The figures show a steady improvement since September 1 after a steady decline for the previous 36 months.

Sessions Clock Company is rehiring many of the employes it laid off a few months ago. For some time it has been practically closed.

E. Ingraham Company is operating two departments on 24 hour day schedules. It is rushed with orders for kitchen equipment. It is doing a fair but not rushing business in radio parts, electric clocks and wrist watches.

TORRINGTON. — Torrington Manufacturing Company is producing motors for the Delta Corporation of Detroit. The motor operates by vacuum to propel the fan of an automobile hot water heating unit.

BRIDGEPORT.—DeVer C. Warner has resigned as treasurer of **Warner Brothers Company** in order to devote all his time to his duties as treasurer of Bridgeport Hydraulic Company. **James W. Byrne** has been elected treasurer of Warner. He was controller for the company.

Remington Arms Company has acquired more than $1,000,000, face value, of its three year 5½% notes, due March 1, during the past year, reducing the amount outstanding to less than $2,000,000.

MERIDEN.—New Departure Manufacturing Company is putting into effect the "share the work plan" at its local plant.

NEW HAVEN. — Marlin-Rockwell Corporation declared a special distribution of 25 cents from surplus on common stock, payable Jan. 2 to stock of record Dec. 22. In three previous quarters similar amounts were paid.

NORWALK.—Judge Edwin S. Thomas of the United States District court has decided in favor of the **Gillette Safety Razor Company** in the suit it brought against the **Standard Safety Razor Corporation** of this city, charging infringement of patents. The latter company has been putting out two blades which fit the Gillette razor. The decision prevents the further sale of these blades.

SHELTON.—American Lady Corset Company of Detroit has brought suit against the **Bassett Metal Goods Company** of this city, asking for an accounting and termination of the company's business. The plaintiff, owner of 547 common and 620 shares of preferred stock, claims the company is not insolvent but that its affairs have been mismanaged. An injunction to restrain **F. A. Russ** of Greenwich, its president, from buying stocks, bonds and securities, and the appointment of a receiver are sought.

GREENWICH.—Electrolux, Inc., has acquired the **Magazine Repeating Razor Company** (Schick razor) plant here which was originally built for the Dalton Machine Tool Company, and will employ about 200 hands. It has another plant in the West. W. R. B.

Providence, Rhode Island

JANUARY 3, 1933.

Man-hours worked in sixteen Rhode Island machine tool and machinery plants in October totalled 785,996, against 552,499 in September, an increase of more than 42%. These figures include operatives, office help, labor and all others. Last year from September to October the increase was less than two per cent. But compared with the 1,041,546 man-hours worked in October, 1931, there is a decrease of nearly 25%. Twenty-five firms manufacturing jewelry reported 4,186 employes for October, 1932, with a total payroll of $868,000, as compared with 4,184 employed in September, 1932, receiving a total wage of $757,000, and 4,623 in October, 1931, at a total payroll of $1,189,000.

James V. Toner, president of **Saart Brothers Company,** Attleboro, has been elected president of the New England Manufacturing Jewelers' and Silversmiths' Association, succeeding **Stephen H. Garner,** who has been president for three years. The new president is also president of the Attleboro Chamber of Commerce, a director of the Attleboro Trust Company, and is professor of accounting at the Boston University School of Business Administration.

General Chain Company is moving its plant from 162 Clifford street, Providence, to the Whiting Building on Broad street, North Attleboro, where it will occupy the floor space formerly occupied by the manufacturing jewelry concern of **Sturtevant and Whiting.**

G. Morville and Sons, Inc., has been incorporated to conduct a manufacturing jewelry business in Providence, by Philip R. Goldberg, Leo M. Goldberg and E. Hartley.

Princess Ring Company, Inc., has changed its name to **Majestic Ring Company, Inc.**

Aurora Jewelry Company, 623 Atwells avenue, Providence, is owned and conducted by **Uncas Manufacturing Company,** of which **N. Sorrentino** is president and treasurer; **Katie Sorren-**

tino vice-president; and **M. Johnson** secretary.

Daniel J. Lowney, 224 Ives Street, is proprietor of **Costume Jewelry Manufacturing Company,** 109 Friendship Street, Providence.

Henry D. Sharpe, president, **Brown and Sharpe Manufacturing Company,** has been elected president of the New England Council, being the fourth man to hold that office succeeding Harry G. Knight of New Haven, Conn. The Council is organized to stimulate and co-ordinate action with respect to economic problems of the New England States.

Frank D. Almy, 68, former president of **Almy Water Tube Boiler Company,** Providence, died suddenly December 14, at his home, 184 Massachusetts Avenue.

W. H. M.

Middle Atlantic States

Central New York

JANUARY 3, 1933.

With industrial leaders waiting to see what happens in Washington, activities among factories in Central New York crawled along this past month at snail's pace. Bright spots were noted here and there, but the general report from the territory was dull.

Oneida Community, Ltd., reported fair business with the regular line, but that better business was being done with a number of sidelines. Business leaders in this territory are looking to Oneida Community to forge ahead rapidly in the coming years. They report a number of younger executives have been added to the firm giving it new blood and that a certain chemical discovery which the company controls will tend to stimulate business in the near future.

From Rome, heart of the copper industry in this territory, no encouraging reports were heard. The employment figure was decidedly low, and the main plants were not sanguine about the immediate outlook. Statistics turned over to the Industrial Association at Utica from the Rome territory showed that payrolls were far from normal. Christmas novelties and copper jars, pitchers and kitchen utensils were stimulating business to a degree.

American Emblem Company, Utica, was reported to be enjoying a good business.

Three men beat and overpowered **Elmer Jones,** watchman at the **Brunner Manufacturing Company,** Utica, makers of compressors, and left him tied in the office while they ransacked the safe. **George L. Brunner,** secretary and treasurer, said the loss was small.

Flames late in November destroyed the Remington Typewriter Foremen's Club at Ilion.

Joseph Daniels, 47, a foreman in the Remington plant at Ilion, died when he fell down the stairs at his home, fracturing his skull.

Thomas Broderick, Rome, traffic manager for the **Revere Brass and Copper Corporation,** died in December after a four-day illness.

E. K. B.

Newark, New Jersey

JANUARY 3, 1933.

Some plants in Newark and vicinity are building new additions and making alterations to take care of increased business. **Durolac Chemical Corporation,** 71 Paris Street, will alter a two-story brick building at 84 Lister Avenue, at cost of $40,000. **Titan Chemical Products, Inc.,** will alter a two-story brick factory building at cost of $28,000. **Montgomery Cylinder and Grinding Company,** 678 Montgomery Street, Jersey City, N. J., will build a two-story brick addition to cost $10,000. The properties of the **Perryman Electric Company,** Hudson Boulevard, North Bergen, have been sold to other manufacturing interests. The plant was formerly used for the manufacture of radio tubes, and is 230 feet in depth. The whole structure will be enlarged.

Barney Larkey has been appointed by Federal Court as receiver for the **American Metal Bed Company,** 109 Bruce Street, Newark. The appointment followed filing of an involuntary petition in bankruptcy. Liabilities are said to be $100,000, with assets of $20,000.

New companies: — **Lincoln Metal Products Corporation,** Newark. **Union Electrical Manufacturing Company,** Newark.

C. A. L.

Trenton, New Jersey

JANUARY 3, 1933.

There has been little change in the metal industry in Trenton during the past month. Some report a little gain in business while others announce no increase.

The machine shop and office of **Duncan Mackenzie Sons Company,** Fieldsboro, N. J., near Trenton, were gutted by flames December 24. A number of valuable patterns were destroyed. A short circuit in the flooring is believed to have caused the blaze. The modern pouring plant escaped damage. The damage is estimated at $8,000, exclusive of the patterns. Office records and equipment were saved by firemen.

C. A. L.

Middle Western States

Detroit, Michigan

JANUARY 3, 1933.

Manufacturers in the nonferrous metal industries have wound up one of the most difficult years in their history. In spite of numerous difficulties, however, they are entering the new year confident there is still much in store for those who have hope and good judgment.

Much has been learned during the past year. Executives have discovered how to stretch a dollar, to produce more economically and better, and to meet difficulties bravely even when disaster seems very near. It has been tough, but it looks now as if the worst were over and that better things are near at hand.

As the year goes out many big plants in the Detroit area are launching into mid-winter activity. Automobile production is getting under way vigorously, and this naturally means business for the platers and manufacturers of accessories. Brass, copper and aluminum are being worked into supplies in greater quantities than at any time since early last summer. Much old transportation equipment needs replacement, and if the public continues to buy, then this entire mid-west industrial area will be active again. It looks now as if it would.

The refrigeration industry promises to equal its record of 1932. It has been active beyond all expectations in spite of disrupted economic conditions. Producers of heating and plumbing supplies are inactive. The new year is not bringing much for them in the way of encouragement. Nevertheless, if general business improves, this branch should respond accordingly.

Murray Corporation of America, body manufacturers, with 3,200 men now at work, expects to add several thousand more during the winter months. **Briggs Manufacturing Company,** in the same business, plans to employ 4,000 more men within the next two or three months, it is announced.

True Alloys, Inc., 1820 Clay avenue, Detroit, was recently incorporated to manufacture non-ferrous metals, with capital stock of $20,000. Incorporator is **Fred P. Rheinfrank.**

Sky Specialties Corporation stockholders have been asked to ratify sale of business and assets of the company to **Mueller Brass Company,** Port Huron, Mich. An exchange of the stock of the two corporations, if approved, would give stockholders of Sky Specialties holdings in the Mueller concern on a basis of one share of Mueller common to three shares of Sky Specialties.

Hayes Body Manufacturing Company, Grand Rapids, went into production again on December 15.

Clark Equipment Company, Buchanan, Mich., recently demonstrated a new type railroad vehicle called an "autotram." It has an aluminum body with an aluminum alloy beam for a backbone, and other parts are made largely of aluminum alloy. It may become a new Michigan industry.

Keeler Brass Company, Grand Rapids, recently purchased the $50,000 issue of the Kent County relief bonds. This is

one of the most successful manufacturing concerns in the state.

L. M. Hamlin has been elected secretary and vice-president of the **McCord Radiator and Manufacturing Company, Charles O. Chestnut,** who has served as assistant treasurer, has been made treasurer to succeed Mr. Hamlin.

Overcome by a heart attack while at work last month, **George S. Dempster,** general superintendent of the **Roberts Brass Manufacturing Company,** died later in the company's hospital. He leaves a widow and one son. He had been with the Robert's organization for more than 25 years. F. J. H.

Toledo, Ohio

JANUARY 3, 1933.

Manufacturing conditions are showing some improvement as the new year begins. Producers of accessories are responding to the demand from the big motor car manufacturers, and platers are doing likewise. The new year gives considerable promise, and more confidence is being expressed than for a long time.

Norman DeVaux, who in 1930 formed the **DeVaux-Hall Motor Company** to build cars at Oakland, Calif., and Grand Rapids, Mich., and in 1932 combined that company with the **Continental Motors Corporation,** has become associated with **Willys-Overland, Inc.,** Toledo. He takes charge of the Willys-Overland Pacific coast plant at Los Angeles which was scheduled to begin production about January 1.—F. J. H.

Chicago, Illinois

JANUARY 3, 1933.

Retail business in Chicago during December enjoyed a more than seasonal upturn, but this activity as yet has been reflected in few other lines.

The "Buy American" campaign, begun here last July and now spreading to other cities, received impetus last week with an election meeting and the opening of offices in the Pure Oil Building. Membership is made up of manufacturers. **Guy V. Dickinson,** general manager of the **Elgin National Watch Company,** was named secretary-treasurer of the organization.

Empire Stove Company has been incorporated at Belleville with $30,000 capital, to conduct a general stove and foundry business.

Robert D. Landrum, author of several books on enamel, and a fellow of the American Ceramic Society, has been appointed to take charge of the Chicago office of the **Harshaw Chemical Company,** Cleveland, Ohio.

Central Die Casting and Manufacturing Company, Inc., has been organized to deal in ferrous and non-ferrous metals.

C. B. Smith, president of the **Stewart-Warner Corporation,** manufacturers of speedometers for Ford automobiles, announces the company will appeal from the decision of the Richmond, Va., equity court that the company must pay a royalty on all speedometers sold for these cars since 1924, to **Marvin Smithey,** who claims to be their inventor.

L. B. Manning, vice president of **Cord Corporation,** announces the sale of Transamerica Airlines to American Airways, Inc., a unit of the Aviation Corporation. A 98 per cent control of Transamerica was recently purchased by the Cord group.

Illinois Manufacturers Association opposes the five day week and unemployment insurance legislation proposals as "dole for the unemployed," according to **James L. Donnelly,** executive vice-president.

The working schedules of all employees in the Kohler, Wis., factory of **Kohler Company** have been increased one day a week, according to announcement by **Herbert V. Kohler,** executive vice-president.

Clement Studebaker, Jr., public utility leader and son of the late wagon and automobile manufacturer, died recently in his Chicago home. R. G. K.

Far West

Los Angeles, California

JANUARY 3, 1933.

DeLaval-Pacific Company has opened shops in Los Angeles and San Francisco in connection with their entry into the field of molten metal spraying. The process has attracted considerable attention on the coast.

Curtis Manufacturing Company has started truck building operations at Downey, near here, and will use considerable metal. **W. G. Hambly** is president; **E. G. Heath** secretary.

Fluor Corporation has opened its new battery factory here.

Spotlight Company, formerly here, has moved its factory to Kaufman Building, Santa Ana. Firm makes fog-piercing headlights for autos and airplanes.

Richard Nutra, Los Angeles architect, has designed an all-metal motor bus of standardized construction but in a variety of types for various parts of the country. He is also working on a standardized all-metal house.

Sunset Plumbing Fixtures, Los Angeles, and **Westcoast Porcelain Manufacturers,** Millbrae, have merged as **Westcoast Sanitary Manufacturers,** 911 East 61st Street, Los Angeles. **Roy C. Troeger** is in charge.

Flexo Manufacturing Company has moved to 1700 9th Street, from former location at East 12th Street. Firm now has 40,000 sq. ft. for manufacture of radiators, condensers and ice machine parts. **C. H. Wentworth** is manager.

Pacific Pipe and Supply Company here will manufacture devices to inject chemicals into gas lines. **H. F. Holderman** is manager.

Western States Sales Company, 3305 San Pedro Avenue, has started manufacture of aluminum pistons.

H. D. Barclay, 6364 Yucca Street, claims he has a new process for making synthetic aluminum, which he values at a million dollars. There is some litigation between him and the **Aluminite Company** of Pennsylvania as to rights to the process, it is reported. The company was formerly in Utah. H. S.

San Francisco, California

Revere Copper and Brass, Inc., New York, has opened sales rooms at 1615 Russ Building, in charge of **R. H. Binns,** Pacific Coast manager.

J. H. Simon, 670 Larkin Street, will manufacture electrical specialties.

San Francisco Soda Fountain Company, 1088 Howard Street, is a new firm which will make soda fountains and do general sheet metal work. **J. S. Courreges** is in charge.

B. K. Sheet Metal Works has started business at 1795 Market Street.

Westinghouse Electric has purchased **Spencer Elevator Company** here and will continue the business with **A. F. Scaife** as general manager.

Jenison Machine Company has moved to a new building at 20th and Tennessee Streets, to make a large line of machinery and parts.

U. S. Spring and Bumper Company has established a branch at 418 Golden Gate Avenue. H. S.

Pacific Coast Notes

R. H. Morehouse and **B. B. Harris** have established the **M. & H. Cleaner Manufacturing Company,** 1060 East 12th Street, Oakland, Calif.

Olympic Foundry, Seattle, Wash., has installed an electric furnace made by **Greene Electric Furnace Company.**

Actionized Industries Company, 4215 Horton Street, Oakland, Calif., has gone into manufacture of flashing lights, traffic and danger signals, lighting devices, fog lights, etc. **Shirlaw Mackay** is president; **William Roberts** is production manager.

Air Flue Gas Furnace Company has opened sales office at 4214 Broadway, Oakland, Calif., to sell heating and other gas appliances. Reports are they will start a plant at Oakland also. **George A. Simmons** is secretary.

Pickwick Motor Coach Works, Inglewood, Calif., has a large order for all-metal and partly metal buses; one amounts to $450,000, it is said. Company has developed a new super-de luxe bus made largely of aluminum alloy, which runs 60 miles an hour, features baths, sleeping compartments, lounge rooms, individual radios, hot water system, air conditioning, and other luxuries.

Johnson Tractor Company, Redlands, Calif., will manufacture a new carburetor. H. S.

Metal Market Review

JANUARY 3, 1933.

Prices of metals during 1932 reflected the general economic condition. With a few exceptions, prices were lower on the average last year than they were in 1931. The exceptions were aluminum, nickel, zinc and tin. Aluminum and nickel are always stable in price. The failure of zinc and tin to drop much lower last year did not, however, mean that their levels were by any means high. It is more than probable, however, that the zinc price was supported by the efforts of producers to keep production in sufficient control to prevent excessive stocks from accumulating. A similar situation as regards the statistical position of tin was the chief stabilizing factor in that market too.

Copper

Copper producers went through a discouraging year, suffering from steady declines in prices. There was no international agreement on production curtailment. After something like an agreement had been effected by most of the world's producers, the latter part of the year saw the breakdown of the conference entirely, due to the insistence of an African producer, Roan Antelope, on being allowed a large increase in its production quota, and the equally determined opposition to such an idea on the part of the other producers. The year closed without a sign of agreement abroad, and with many signs pointing to a serious competitive battle between the foreign producers. Domestic producers are less oppressed at this time by virtue of some internal agreement on curtailment of production, and the 4 cent tariff which was imposed on imports of copper begining last June. There is no practical basis for predicting price trends very far ahead in a basic commodity market, but it was the general view in both producing and consuming circles at the close of 1932 that the new year would not see any very sharp upturn in the copper price, barring some miraculous cure of the depression.

In December copper business was dull. The price showed no serious change from the previous month's average. Electrolytic opened the month at 5.25 cents Connecticut Valley basis, and closed at 5.125 cents, while the December average was just a shade above 5 cents, practically unchanged from November. This, however, was over 2 cents below the year's opening. The breakdown of the international conference of producers in December did not ruffle the market greatly.

Zinc

The zinc industry last year probably showed the most wisdom of any of the basic metal producing lines. It kept in mind throughout 1932 the necessity of keeping surplus stocks from overtopping the consuming possibilities of the country, and this course was reflected in price stability as compared with most other metals. Continued efforts to spread the use of zinc by promotion and by development of new applications helped to keep the business as active as possible.

In December zinc maintained its price level fairly well a 3.12½ cents East St. Louis, but without much supporting demand from consumers. Producers made little effort to force sales, preferring, obviously, to wait for some return of demand. It was the general view in the trade at the end of December that supplies in consumers' hands were not large and that the turn of the year might easily see a fair amount of business transacted.

The price of zinc at the close of 1932 was some 10 points higher than at the beginning of the year. The low level for the year was touched in May, with an average of just over 2.50 cents, while the high point of the year was September, with an average of over 3.30 cents.

Tin

Tin business was sharply curtailed during 1932, suffering, like all commodities, from a serious decline in consumption. The steel industry's low rate of production naturally cut down the use of tin for tinplate, which is the largest outlet. Other consumer requirements were also at a minimum. However, the statistical position of the metal—figures of supplies and production—was not allowed to affect its price adversely. That is, the producers evidently managed to keep production under such control that there was no anticipation of large surplus accumulations to weaken the price structure. Thus tin ended the year with a December average in the neighborhood of 22.50 cents, as compared with 21.84 cents for January, 1932. The year's highest monthly average, 24.76 cents, was reached in September, while the low point of 19.25 cents was touched in April.

December trading was inactive, with the price tendency strong. There was no real buying movement.

Lead

The lead business last year was considerably smaller than in 1931, as indicated by the figures for domestic shipments of refined lead for the first 11 months, amounting to 284,183 tons, as compared with 399,652 tons for the same period in 1931. (December figures unavailable at this writing.)

The price situation was comparable to that of most nonferrous metals, being steadily downward through the greater part of the year, with the exception of August and September, when there was a slight upward inclination. The average of daily prices in January stood at 3.55 cents East St. Louis, whereas at the end of the year it was 2.88 cents.

December saw a moderate demand for metal, especially about the middle of the month. Early in the month the price dropped from 2.90 cents East St. Louis to 2.875, at which point it remained steady for the balance of the period. The only substantial business reported was from battery makers. The sales for December shipment amounted to slightly under 20,000 tons, or some 6,300 tons below the average for the preceding 11 months.

Aluminum

Aluminum was one of the few metals to maintain an unchanged basic price during 1932. The level of 23.30 cents per pound was quoted throughout the year for "Alcoa" commercial and 99%-plus mill ingot.

There was no relaxation on the part of the industry in research, and in development of new applications. Light alloys continue to meet with an expanding market, and with the uses now in contemplation a resumption of anything like normal business should see large quantities of the metal go into consumption.

Antimony

Antimony was no exception to the general rule of contracting demand and falling prices last year. The price tendency in general was downward; although momentary recoveries were frequent, there was no stability, and declines promptly offset every upward move. The daily average of the price base for January, 1931, was 6.013 cents, whereas in July it had dropped to 5 cents, and the final month of the year found it at 5.42 cents. There were frequent flurries of excitement due to war and other disturbances in China, but nothing of great moment was recorded.

In December the market was held within the very narrow range of 5.40 to 5.60 cents, with the lower level prevailing at the end of the month.

Platinum

The platinum market was not very active during 1932. While some metal continued to go into the electrical, chemical and other technical fields, the jewelry industry did not absorb metal in any real quantity. The same comment applies to most of the platinum group of metals. There was some interest in commercialization of the very rare metal, indium, but general conditions are no doubt responsible for the comparative obscruity into which this development has apparently fallen. Plating continued to absorb small amounts of platinum and rhodium.

The price fell steadily throughout 1932. From January to May it held at about $37.50. Thereafter it declined by the month, and in December the low level of $28 to $30 was reached when the leading platinum interest reduced the price by $3 an ounce to $30, and cash transactions between dealers and refiners on the basis of around $28 were reported.

Silver

Silver was the subject of considerable political discussion during 1932. Monetization as a means of bringing about demand for American products in the Orient was suggested as a means of combating depression. However, progress in that di-

rection was not great, and silver producers continue to seek some means of aiding their industry.

Silver trading on the Metal Exchange at New York was further perfected last year.

The price reached a new low of 24.25 cents in December, having broken through the 25 cent level just before the end of the year. The highest average of daily prices in 1932 prevailed during February, when it was a shade above 30 cents. The low average, of course, came in December, at just above 25 cents.

Scrap Metals

Business in scrap metals during the year was restricted, in line with the low rate of industrial operations both here and abroad. The export market was lively at times but did not assume any exciting proportions. The levels of prices throughout the list reflected the markets for virgin metals. Aluminum and nickel grades were generally firm, while the others fluctuated constantly, but with a steady downward tendency.

There was, of course, no diminution in the use of scrap in proportion to virgin metals. Constant attention to improvement of refining methods has resulted in increasing the use of ingot metal produced wholly or partly of scrap, especially in the copper-base and aluminum-base lines. The benefits of such conservation, of course, will not be fully appreciated until there is a real gain in industrial activity, but the importance of this field is by no means being overlooked. A significant indication along these lines is the interest shown in scrap by companies engaged primarily in virgin metal production.

A list of current scrap metal quotations will be found on page 43.

The Wrought Metal Business

Review of the Past Year

JANUARY 3, 1933.

The past year was as poor for the wrought metal lines as it was for the majority of other lines of business. Constricted demand was to be expected while the rate of industrial activity dragged along at low ebb. In view of this, the optimism which was shown in many branches of this field of industry is worth mentioning. This hopeful attitude in the face of adverse conditions was evident in the continuance of research in the laboratories, experimentation in the plants, and development of markets afield.

The companies engaged in copper and brass fabrication, along with the copper producers, continued to promote the use of the copper base metals and alloys, while scientific research was successful in developing some new materials. The latter included electro-sheet copper, providing by an economical production method extra thin sheet metal in widths heretofore prohibitively expensive to make, and which can be used for roofing and other purposes; and beryllium copper, a new alloy of pure copper with very small percentages of beryllium, which is said to have extraordinary physical properties, and which can be improved by heat treatment. A rapid means of producing a patina on copper was perfected.

The revival of interest in copper household utensils was undertaken, a plating of chromium being applied instead of the old style tin coating for the inner surfaces. The use of copper and brass pipe for buildings and homes was promoted steadily. A large outlet for copper products was seen in the rapidly growing field of air conditioning and radiation, where a great deal of metal already is going. It was predicted by an authority that these two outlets will double their consumption of copper every four years for the next twenty years. That means copper in the forms of sheet and tubing, chiefly.

The other metals were also promoted steadily. Lead, nickel, zinc, aluminum and their alloys were sponsored by various producers independently, or through the promotional organizations to which they belong. Nickel and Monel metal were extensively advertised, with emphasis on Monel kitchen sinks and other kitchen equipment. Zinc for roofing, as a heavy coating on steel sheet, and in the form of die-cast products was promoted steadily. The lead interests continued to sponsor their products in the forms of pipe and sheet, as a coating for copper roofing, and as a durable metal for producing a great variety of cast and wrought architectural and decorative work. Aluminum continued to be extensively publicized, with stress on its advantages as a construction material.

Daily Metal Prices for December, 1932

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	1	2	5	6	7	8	9	12	13	14	15	16	19
Copper c/lb. Duty 4c/lb.													
Lake (Del.)	5.375	5.375	5.375	5.375	5.375	5.25	5.125	5.125	5.125	5.125	5.125	5.125	5.125
Electrolytic (Conn.)	5.125	5.125	5.125	5.125	5.125	5.125	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Casting (f.o.b. ref.)	5.00	5.00	5.00	5.00	5.00	5.00	4.875	4.75	4.75	4.75	4.75	4.75	4.75
Zinc (f.o.b. St. L.) c/lb. Duty 1¼c/lb.													
Prime Western	3.125	3.125	3.125	3.125	3.125	3.125	3.125	3.125	3.125	3.125	3.125	3.125	3.125
Brass Special	3.175	3.175	3.175	3.175	3.175	3.175	3.175	3.175	3.175	3.175	3.175	3.175	3.175
Tin (f.o.b. N. Y.) c/lb. Duty Free													
Straits	22.65	22.45	22.45	22.55	22.75	22.65	22.50	22.65	22.55	22.55	22.80	22.80	22.85
Pig 99%	21.40	21.20	21.25	21.35	21.55	21.45	21.30	21.40	21.30	21.90	21.55	21.50	21.55
Lead (f.o.b. St. L.) c/lb. Duty 2¼c/lb.	2.90	2.90	2.90	2.90	2.90	2.875	2.875	2.875	2.875	2.875	2.875	2.875	2.875
Aluminum c/lb. Duty 4c/lb.	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3c/lb.													
Electrolytic 99.9%	35	35	35	35	35	35	35	35	35	35	35	35	35
Shot (from remelted electrolytic)	36	36	36	36	36	36	36	36	36	36	36	36	36
Pellets 99.5-100%	40	40	40	40	40	40	40	40	40	40	40	40	40
Antimony (Ch. 99%) c/lb. Duty 2c/lb.	5.60	5.50	5.45	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40
Silver c/oz. Troy Duty Free	25.25	25.00	25.125	25.25	25.50	25.50	25.375	25.375	25.125	25.125	25.125	25.125	25.25
Platinum $/oz. Troy Duty Free	30.00	30.00	30.00	30.00	30.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00	28.00

	20	21	22	23	*26	27	28	29	30	High	Low	Aver.
Copper c/lb. Duty 4c/lb.												
Lake (Del.)	5.125	5.125	5.125	5.125	....	5.125	5.125	5.125	5.125	5.375	5.125	5.190
Electrolytic (Conn.)	5.00	5.00	5.00	5.00	....	5.00	5.00	5.00	5.00	5.125	5.00	5.036
Casting (f.o.b. ref.)	4.75	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	5.00	4.75	4.827
Zinc (f.o.b. St. L.) c/lb. Duty 1¼c/lb.												
Prime Western	3.125	3.125	3.125	3.125	....	3.125	3.125	3.125	3.125	3.125	3.125	3.125
Brass Special	3.175	3.175	3.175	3.175	....	3.175	3.175	3.175	3.175	3.175	3.175	3.175
Tin (f.o.b. N. Y.) c/lb. Duty Free												
Straits	22.85	22.85	22.80	22.75	....	22.75	22.75	22.80	22.75	22.85	22.45	22.690
Pig 99%	21.55	21.50	21.45	21.40	....	21.50	21.50	21.55	21.50	21.90	21.20	21.460
Lead (f.o.b. St. L.) c/lb. Duty 2¼c/lb.												
Aluminum c/lb. Duty 4c/lb.	2.875	2.875	2.875	2.875	....	2.875	2.875	2.875	2.875	2.90	2.875	2.881
Nickel c/lb. Duty 3c/lb.	23.30	23.30	23.30	23.30	....	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Electrolytic 99.9%	35	35	35	35	....	35	35	35	35	35	35	35
Shot (from remelted electrolytic)	36	36	36	36	....	36	36	36	36	36	36	36
Pellets 99.5-100%	40	40	40	40	....	40	40	40	40	40	40	40
Antimony (Ch. 99%) c/lb. Duty 2c/lb.	5.40	5.40	5.40	5.40	....	5.40	5.40	5.40	5.50	5.60	5.40	5.421
Silver c/oz. Troy Duty Free	25.25	25.00	24.875	24.875	....	24.625	24.375	24.25	24.375	25.50	24.25	25.036
Platinum $/oz. Troy Duty Free	28.00	28.00	28.00	28.00	....	28.00	28.00	28.00	28.00	30.00	28.00	28.476

*Holiday.

Metal Prices, January 10, 1933

(Duties mentioned refer to U. S. tariffs on imports, as given in the Tariff Act of 1930, and revisions)

NEW METALS

Copper: Lake, 5.125. Electrolytic, 5.00. Casting, 4.75.
Zinc: Prime Western, 3.10. Brass Special, 3.15.
Tin: Straits, 22.65. Pig, 99%, 21.40.
Lead: 2.875. Aluminum, 23.30. Antimony, 5.50.
Nickel: Ingot, 35. Shot, 36. Elec., 35. Pellets, 40.
Quicksilver: Flask, 75 lbs., $49. **Bismuth,** 85.
Cadmium, 55. **Cobalt,** 97%, $2.50. **Silver,** Troy oz., official price, N. Y., January 10, 25.125.
Gold: oz., Troy, $20.67. **Platinum,** oz., Troy, $28-$30.

Duties: Copper, 4c. lb.; zinc, 1¾c. lb.; tin, free; lead, 2½c. lb.; aluminum, 4c. lb.; antimony, 2c. lb.; nickel, 3c. lb.; quicksilver, 25c. lb.; bismuth, 7½%; cadmium, 15c. lb.; cobalt, free; silver, free; gold, free; platinum, free.

INGOT METALS AND ALLOYS

	Cents lb.	Duty
Brass Ingots, Yellow	4⅛ to 5¾	45%
Brass Ingots, Red	5½ to 7½	45%
Bronze Ingots	6¼ to 10	45%
Aluminum Casting Alloys	8 to 22½	4c. lb.
Manganese Bronze Castings	16 to 30	45%
Manganese Bronze Ingots	6½ to 10	45%
Manganese Bronze Forgings	22 to 33	45%
Manganese Copper, 30%	18 to 25	25%
Monel Metal Shot or Blocks	.. 28	25%
Phosphor Bronze Ingots	6½ to 10	45%
Phosphor Copper, guaranteed 15%	10 to 16	3c. lb.
Phosphor Copper, guaranteed 10%	9¼ to 14½	3c. lb.
Phosphor Tin, no guarantee	30 to 45	Free
Silicon Copper, 10%	18 to 30	45%
Iridium Platinum, 5%	$30.00	Free
Iridium Platinum, 10%	$31.00	Free

OLD METALS

Dealers' buying prices, wholesale quantities	Cents lb.	Duty
Heavy copper and wire, mixed	3¼ to 3⅜	Free
Light copper	2⅝ to 2⅞	Free
Heavy yellow brass	1⅝ to 1¾	Free
Light brass	1¼ to 1½	Free
No. 1 composition	2½ to 2⅝	Free
Composition turnings	2⅜ to 2½	Free
Heavy soft lead	2⅛ to 2¼	2½c. lb.
Old zinc	1⅛ to 1⅜	1½c. lb.
New zinc clips	1⅝ to 1⅞	1½c. lb.
Aluminum clips (new, soft)	10¼ to 11¼	4c. lb.
Scrap aluminum, cast, mixed	3¾ to 4	4c. lb.
Scrap aluminum, sheet (old)	8 to 8½	4c. lb.
No. 1 pewter	12 to 12½	Free
Electrotype or stereotype	1¾ to 2	2½c. lb.*
Nickel anodes	22 to 24	10%
Nickel clips and turnings	17 to 25	10%
Monel scrap	5½ to 9	3c. lb.

* On lead content.

Wrought Metals and Alloys

The following are net BASE PRICES per pound, to which must be added extras for size, shape, small quantity, packing, etc., as shown in manufacturers' price lists, effective January 2, 1933.

COPPER MATERIAL

	Net base per lb.	Duty
Sheet, hot rolled	13⅝c.	2½c. lb.
Bare wire, soft	8c.	25%
Seamless tubing	12⅜c.	7c. lb.
Soldering coppers	14¾c.	45%

NICKEL SILVER

Net base prices per lb. (Duty 30% ad valorem.)

Grade "A" Sheet Metal		Wire and Rod	
10% Quality	19⅝c.	10% Quality	22½c.
15% Quality	21¾c.	15% Quality	26⅞c.
18% Quality	23c.	18% Quality	30⅛c.

BRASS MATERIAL—MILL SHIPMENTS

Net base prices per pound

Net per lb.	High Brass	Low Brass	Bronze	Duty
Sheet	11c.	12⅛c.	12½c.	4c. lb.
Wire	11c.	12⅛c.	12½c.	25%
Rod	8½c.	11⅜c.	12¼c.	4c. lb.
Open seam tubing	19c.		20½c.	25%
Angles, channels	19c.		20½c.	12c. lb.
Seamless tubing	13¼c.		14¾c.	8c. lb.

TOBIN BRONZE AND MUNTZ METAL

Net base prices per pound. (Duty 4c. lb.)

Tobin Bronze Rod	12¼c.
Muntz or Yellow Metal Sheathing (14"x18")	13⅛c.
Muntz or Yellow Rectangular sheet other sheathing	13⅛c.
Muntz or Yellow Metal Rod	9½c.

ALUMINUM SHEET AND COIL

(Duty 7c. per lb.)

Aluminum sheet, 18 ga., base, ton lots, per lb.	32.30
Aluminum coils, 24 ga., base price	30.00

ROLLED NICKEL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Net Base Prices

Cold Drawn Rods	50c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

MONEL METAL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

SILVER SHEET

Rolled sterling silver (January 10) 28.50c. per Troy oz. upward according to quantity. (Duty free.)

ZINC AND LEAD SHEET

	Cents per lb. Net Base	Duty
Zinc sheet, carload lots, standard sizes and gauges, at mill, less 7 per cent discount	9.00	2c. lb.
Zinc sheet, full casks (jobbers' price)	9.25	2c. lb.
Zinc sheet, open casks (jobbers' price)	10.00 to 10.25	2c. lb.
Full Lead Sheet (base price)	6.50	2⅜c. lb.
Cut Lead Sheet (base price)	6.75	2⅜c. lb.

BLOCK TIN, PEWTER AND BRITANNIA SHEET

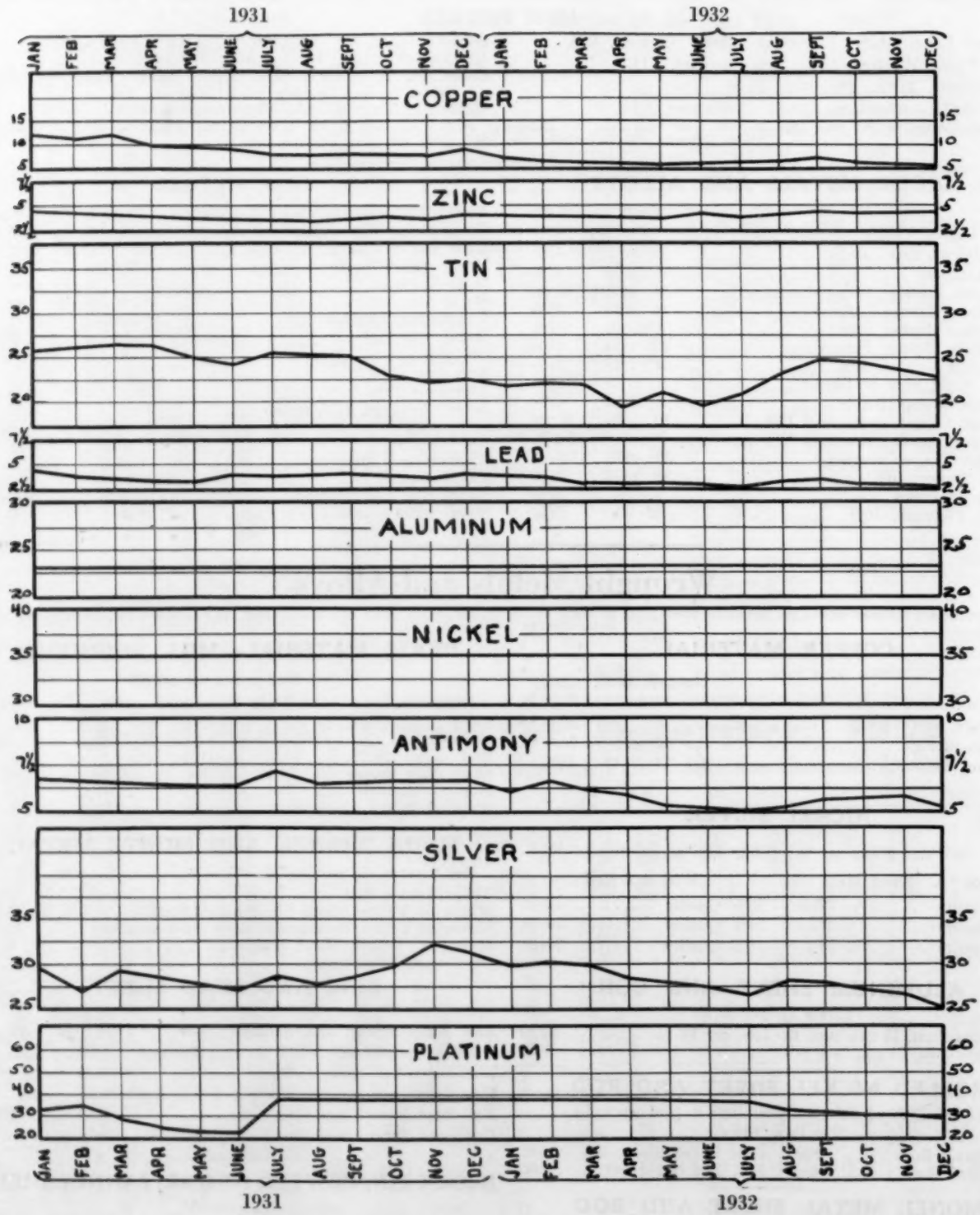
(Duty free)

This list applies to either block tin or No. 1 Britannia Metal Sheet, No. 23 B. & S. Gauge, 18 inches wide or less; prices are all f. o. b. mill:

500 lbs. or over	15c. above N. Y. pig tin price
100 to 500 lbs.	17c. above N. Y. pig tin price
Up to 100 lbs.	25c. above N. Y. pig tin price

Lighter gauges command "extras" over the above prices.

Chart of Metal Prices for 1931-1932



NOTE:—Prices shown on left and right edges of chart are in cents per pound, except for silver and platinum, which are in cents per troy ounce and dollars per troy ounce, respectively.

Supply Prices—Page 46

Pig Iron and Metal Products of the United States

Calendar Years 1923-1931. (1932 Estimated.)

(FIGURES THROUGH 1931 FROM THE UNITED STATES BUREAU OF MINES)

PRODUCTS METALLIC	1923 Quantity	1923 Value	1924 Quantity	1924 Value	1925 Quantity	1925 Value	Products
Pig iron (spot value), long tons	38,361,379	$946,799,378	31,064,129	$665,078,972	36,814,702	$739,316,333	Pig iron
Copper, sales value, pounds	1,434,999,962	210,945,000	1,634,249,192	214,087,000	1,674,869,886	237,832,000	Copper
Zinc, sales value, short tons	508,335	69,134,000	515,831	67,058,000	555,631	84,456,000	Zinc
Tin, short tons	2	1,623	7	7,028	14	15,980	Tin
Lead (ref.) sales value, short tons	543,841	76,138,000	566,407	90,625,000	654,921	113,956,000	Lead
Aluminum, pounds	129,000,000	28,305,000	150,000,000	37,607,000	140,000,000	36,430,000	Aluminum
Nickel, value at New York, short tons	100	71,605	191	114,903	272	169,664	Nickel
Quicksilver, value at N. Y.,† flasks (e)	7,937	521,302	10,085	692,739	9,174	762,616	Quicksilver
Antimonial lead, short tons (F.&D.)	14,190	1,950,370	20,787	3,376,713	19,667	3,785,547	Antim. Lead
Silver, commercial value, troy ounces	73,335,170	60,134,839	65,407,186	43,822,814	66,155,424	45,911,864	Silver
Gold, coining value, troy ounces	2,502,632	51,734,000	2,528,900	52,277,000	2,411,987	49,860,200	Gold
Platinum and allied metals, value at New York City, in troy ounces	49,797	5,762,305	66,007	7,611,319	49,643	5,661,809	Platinum
Total value of metallic products (approximate) (b)		$1,510,930,000		$1,232,330,000		$1,380,280,000	

PRODUCTS METALLIC	1926 Quantity	1926 Value	1927 Quantity	1927 Value	1928 Quantity	1928 Value	Products
Pig iron (spot value), long tons	38,181,053	$749,633,468	34,866,644	$646,226,139	38,303,699	$661,351,270	Pig iron
Copper, sales value, pounds	1,739,622,094	243,547,000	1,684,040,983	220,609,000	1,825,900,393	262,930,000	Copper
Zinc, sales value, short tons	611,991	91,799,000	576,960	73,851,000	591,525	72,166,000	Zinc
Tin, short tons	8	10,400	27	34,600	47	47,400	Tin
Lead (ref.) sales value, short tons	680,685	108,910,000	668,320	84,208,000	626,202	72,639,000	Lead
Aluminum, pounds	145,000,000	37,583,000	160,000,000	39,266,000	210,000,000	47,899,000	Aluminum
Nickel, value at New York, short tons	323	234,558	860	390,740	522	291,836	Nickel
Quicksilver, value at N. Y., flasks (e)	7,642	702,323	11,276	1,314,782	17,870	2,207,003	Quicksilver
Antimonial lead, short tons (F.&D.)	22,524	3,916,714	24,347	3,277,043	33,058	3,978,318	Antim. Lead
Silver, commercial value, troy ounces	62,718,746	39,136,497	60,434,441	34,266,328	58,462,507	34,200,567	Silver
Gold, coining value, troy ounces	2,335,042	48,269,600	2,197,125	45,418,600	2,233,251	46,165,400	Gold
Platinum and allied metals, value at New York City, troy ounces	84,981	9,210,669	46,050	3,780,216	59,039	4,692,786	Platinum
Total value of metallic products (approximate) (b)		$1,402,920,000		$1,217,000,000		$1,284,580,000	

PRODUCTS METALLIC	1929 Quantity	1929 Value	1930 Quantity	1930 Value	1931 Quantity	1931 Value	Products
Pig iron (spot value), long tons	41,549,161	$731,858,075	29,905,355	$512,165,131	17,812,579	$285,147,156	Pig iron
Copper, sales value, pounds	2,002,863,135	352,504,000	1,394,389,327	181,271,000	1,042,711,178	94,887,000	Copper
Zinc, sales value, short tons	612,136	80,802,000	489,361	46,979,000	291,996	22,192,000	Zinc
Tin, short tons	39	35,600	17	10,500	4.1	2,050	Tin
Lead (ref.) sales value, short tons	672,498	84,735,000	573,740	57,374,000	390,260	28,879,000	Lead
Aluminum, pounds	225,000,000	51,864,000	229,035,000	50,961,000	177,544,000	37,284,000	Aluminum
Nickel, value at New York, short tons	340	297,273	308	213,803	372	202,406	Nickel
Quicksilver, value at N. Y., flasks (e)	23,682	2,892,638	21,553	2,478,789	24,947	2,179,145	Quicksilver
Antimonial lead, short tons (F.&D.)	25,669	3,267,095	13,711	1,392,524	(f)	(f)	Antim. Lead
Silver, commercial value, troy ounces	61,327,868	32,687,754	50,748,127	19,538,029	30,932,050	8,970,294	Silver
Gold, coining value, troy ounces	2,208,386	45,651,400	2,285,603	47,247,600	2,395,878	49,527,200	Gold
Platinum and allied metals, value at New York City, in troy ounces	47,977	3,121,471	43,502	2,048,824	36,205	1,274,029	Platinum
Total value of metallic products (approximate) (b)		$1,475,990,000		$982,550,000		*	

ESTIMATES OF UNITED STATES PRODUCTION FOR 1932	Quantity	Value Total	Value Per Unit
Pig iron (spot value) long tons	8,686,443	$121,610,202	$14.00 ton (a)
Copper, sales value, short tons	264,000	29,890,000	5.68c. lb. (c)
Zinc, sales value, short tons	210,000	12,100,000	2.881c. lb. (d)
Tin (U. S. deliveries) long tons	36,320	17,900,000	22.011c. lb.
Lead (pig), sales value, short tons	290,000	17,572,000	3.041c. lb. (d)
Aluminum, short tons	*	*	*
Silver, troy ounces, at N. Y. official price average	23,400,000	6,526,700	27.892c oz.
Gold, troy ounces	2,500,000	51,836,400	$20.67 oz.

(a) Composite, from The Iron Age.

(b) Includes some items of minor interest to metal trades not shown in table.

(c) New York. (d) E. St. Louis.

†At San Francisco through 1924; N. Y. thereafter.

(e) For years 1920 to 1927, inclusive, mercury reported by the Bureau of Mines in flasks of 75 pounds; for 1928 and succeeding years, in flasks of 76 pounds.

(f) No longer calculated separately.

*Figures unavailable at date of issue.

Supply Prices, January 10, 1933

ANODES

Copper: Cast ..... 16¼c. per lb.
Rolled, sheets, trimmed ..... 14¼c. per lb.
Rolled, oval ..... 13½c. per lb.
Brass: Cast ..... 14½c. per lb.
Zinc: Cast ..... 08¾c. per lb.

Nickel: 90-92% ..... 42c. to 46c. per lb.
95-97% ..... 43c. to 47c. per lb.
99% cast, 45c. to 49c.; rolled, depolarized, 46c. to 50c.
Silver: Rolled silver anodes .999 fine were quoted January 10 from 28.50c., per Troy ounce upward, depending upon quantity.

WHITE SPANISH FELT POLISHING WHEELS

Diameter	Thickness	Under 50 lbs.	50 to 100 lbs.	Over 100 lbs.
10-12-14 & 16	1" to 2"	$2.85/lb.	$2.55/lb.	$2.35/lb.
10-12-14 & 16	2 to 3½	2.75	2.45	2.25
6-8 & over 16	1 to 2	2.95	2.65	2.45
6-8 & over 16	2 to 3½	2.90	2.60	2.35
6 to 24	Under ½	4.15	3.85	3.65
6 to 24	½ to 1	3.85	3.55	3.35
6 to 24	Over 3½	3.25	2.95	2.75
		Any Quantity		
4 to 6	Under ½, $4.90	½-1, $4.75	1 to 3, $4.65	
1½ to 4	" 5.45	" 5.30	" 5.25	
1 to ½	" 5.75	" 5.60	" 5.50	

Extras: 25c. per lb. on wheels, 1 to 6 in. diam., over 3 in. thick.
On grey Mexican wheels deduct 10c. per lb. from above prices.

COTTON BUFFS

Full disc open buffs, per 100 sections when purchased in lots of 100 or less:

11" 20 ply 64/68 Unbleached	$14.49 to 16.60
14" 20 ply 64/68 Unbleached	24.28 to 27.40
11" 20 ply 80/92 Unbleached	16.61 to 18.70
14" 20 ply 80/92 Unbleached	24.28 to 31.10
11" 20 ply 84/92 Unbleached	20.33 to 25.05
14" 20 ply 84/92 Unbleached	34.04 to 41.95
Sewed Pieced Buffs, per lb., bleached	30c. to 70c.

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.09¾-.14
Acid—Boric (Boracic) granular, 99½+% ton lots	lb.	.04½-.05
Chromic, 75 to 400 lb. drums	lb.	.12-.17½
Hydrochloric (Muriatic) Tech., 20 deg., carboys	lb.	.02
Hydrochloric, C. P., 20 deg., carboys	lb.	.06
Hydrofluoric, 30%, bbls.	lb.	.08-.12
Nitric, 36 deg., carboys	lb.	.06-.06½
Nitric, 42 deg., carboys	lb.	.07-.08
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl	lb.	11.30-18.00
Denatured drums	gal.	.475-.476
Alum—Lump, barrels	lb.	.03¼-.04
Powdered, barrels	lb.	.03½-.05
Ammonia, aqua, 26 deg., drums, carboys	lb.	.02¾-.05
Ammonium—Sulphate, tech., bbls.	lb.	.03½-.05
Sulphocyanide	lb.	.28-.37
Arsenic, white, kegs	lb.	.04½-.05
Asphaltum	lb.	.35
Benzol, pure	gal.	.58
Borax, granular, 99½+%, ton lots	lb.	.02¼-.02¾
Cadmium oxide, 50 to 1,000 lbs.	lb.	.55
Calcium Carbonate (Precipitated Chalk)	lb.	.05¾-.07½
Carbon Bisulphide, drums	lb.	.05½-.12
Chrome Green, bbls.	lb.	.19
Chromic Sulphate	lb.	.30-.40
Copper—Acetate (Verdigris)	lb.	.20
Carbonate, bbls.	lb.	.14-.20
Cyanide (100 lb. kgs.)	lb.	.39
Sulphate, bbls.	lb.	2.75-5.25
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.20¼-.20½
Crocus	lb.	.15
Dextrin	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluorspar, bags	lb.	.04½
Gold Chloride	oz.	$12.00
Gum—Sandarac	lb.	.26
Shellac	lb.	.32-.34
Iron Sulphate (Copperas), bbls.	lb.	.01½
Lacquer Solvents	gal.	.85
Lead—Acetate (Sugar of Lead)	lb.	.09-.13
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Methanol, 100% synth., drums	gal.	.41½
Nickel—Carbonate, dry, bbls.	lb.	.32
Chloride, bbls.	lb.	.16-.21
Salts, single, 300 lb. bbls.	lb.	.11-.13
Salts, double, 425 lb. bbls.	lb.	.11-.13
Paraffin	lb.	.05-.06
Phosphorus—Duty free, according to quantity	lb.	.35-.40
Potash Caustic Electrolytic 88-92% broken, drums	lb.	.06¾-.08½
Potassium—Bichromate, casks (crystals)	lb.	.08½
Carbonate, 96-98%	lb.	.06⅝
Cyanide, 165 lbs. cases, 94-96%	lb.	.50
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge—Nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in bbls.	lb.	.05-.05½
Silver—Chloride, dry, 100 oz. lots	oz.	.23-.27½
Cyanide (fluctuating)	oz.	.30-.37½
Nitrate, 100 ounce lots	oz.	.20-.23¾
Soda Ash, 58%, bbls.	lb.	.023
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.16½-.22
Beryllium fluoride ($2NaF.BeF_2$)	lb.	4.30-7.00
Hyposulphite, kegs, bbls.	lb.	.03½-.06½
Metasilicate	lb.	.05-.06¼
Nitrate, tech., bbls.	lb.	.03¼-.07
Phosphate, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.01½
Stannate, fluctuating	lb.	.21½
Sulphocyanide	lb.	.30-.45
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, fluctuating, 100 lb. kegs	lb.	.25-.25½
Tripoli, powdered	lb.	.03
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc—Carbonate, bbls.	lb.	.11
Chloride, drums, bbls.	lb.	.07½-.10
Cyanide (100 lb. kegs)	lb.	.38
Sulphate, bbls.	lb.	.03½

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NO. 82-A
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